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Canadian Food Consumption Patterns and Nutrition Trends

Report

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CANADIAN FOOD CONSUMPTION
PATTERNS AND NUTRITION TRENDS

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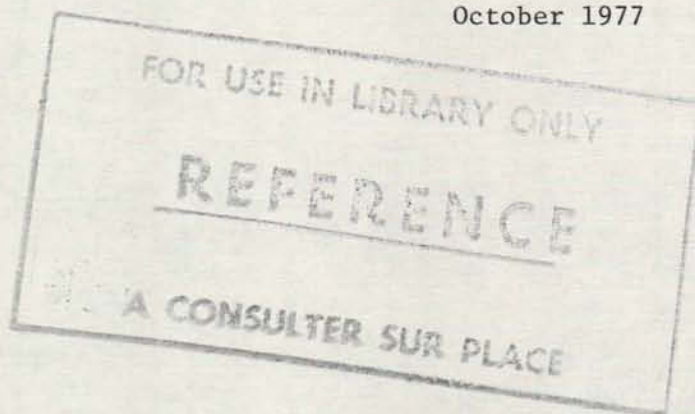


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In assessing the need for and direction of development of a food policy for Canada, it is critical that the changing patterns of food consumption and nutrient intakes by Canadians be assessed. At the same time, a critical review of available knowledge relating to food consumption trends and nutrient intakes must be made to identify areas of need for future research that will help to formulate programs for improvement of food choice behavior to ensure a socially and economically acceptable level of health and quality of life for the Canadian population.

This project was initiated by the Food Policy Advisory Group, Consumer and Corporate Affairs Canada, to identify and critically assess existing and accessible data to determine trends in food consumption and nutrient intake of Canadians for the period 1950 to 1975. In this study, statistics published by Statistics Canada on per capita apparent food consumption, household food expenditure and household food purchases, and by National Health and Welfare and other groups on nutrient intake and food consumption are summarized and interpreted. Of these data sources only apparent food consumption data are in time series that lend themselves to trend analysis. The other data sources have been generated by survey and represent a sampling of the population at a point in time. Unfortunately most of the data sources do not report what was actually consumed by individuals or groups. However, given these limitations, an assessment has been made of inferred food consumption trends and nutrient intake patterns over time and implications have been drawn to the possible effects of current and past food choice behavior on the the general health and quality of life of the Canadian population for consideration in development of a national food policy.

From examination of per capita apparent food consumption data for the past 25 years, certain trends emerge to indicate major changes in some food consumption patterns. Apparent food consumption data are limited in scope in that they represent national averages developed from food disappearance statistics. Although the data account for domestic disappearance of food from all sources--homes, institutions, restaurants, etc.--they do not account for any differences in consumption patterns within these sectors or within segments of the population, nor do the data take account of food wastage at the retail store level, in food preparation and storage, or resulting from plate scraps and garbage. No data exist to comprehensively assess the amount of food, and consequently nutrients, reportedly "consumed" but not actually ingested. However, given these limitations to the scope of per capita disappearance data, some major changes in apparent eating patterns are evident.

Generally, apparent per capita consumption of cereals, particularly wheat flour, has declined over the past 25 years although in 1974/1975 this downward trend may have tended to stabilized. At the same time, apparent per capita consumption of visible fats and oils, particularly vegetable-oil based products such as margarine, salad oil and shortening, has increased significantly. This increase in vegetable source oils has been accompanied by a decline in visible animal-fat based foods such as lard and butter. A major trend increase is evident in apparent per capita total red meat consumption, contributed largely by beef, and in

chicken and turkey consumption. Total milk consumption has shown a generally steady decline over the past 25 years, largely due to the decrease in apparent per capita fluid milk consumption. Conversely, however, some processed dairy products, notably cheese, ice cream and concentrated milk by-products, have shown an increase in rate of per capita consumption.

Per capita apparent consumption of total fruits and vegetables has tended to increase over the past 18 years of reported data, primarily as a result of increased consumption of processed fruits and vegetables, although in the most recent years reported, an increase in apparent consumption of fresh products, especially vegetables, is evident.

Generally over the 25-year period of trend data assessed, there have been no major identifiable trends in apparent per capita consumption of sugar, eggs, fish, legumes and potatoes although each commodity type has evidenced fluctuating annual apparent consumption rates both in total for the category and in some cases, such as pulses and nuts, in the mix within the category. For the last two years of data reported, refined sugar has shown a decrease in level of apparent per capita consumption and pulses and nuts an increase contributed largely by an increase in dry beans in 1974 and peanuts in 1975.

Apparent consumption has been reported by Statistics Canada as time series data for only selected beverage products. From these data, it would appear that per capita consumption of tea, cocoa and coffee, based on tea leaf and green bean equivalents, may have stabilized in the past few years with tea at a lower level and coffee at a higher level than 25 years ago. Other beverage products such as carbonated soft drinks, alcoholic beverages and wine have not been reported in terms of per capita consumption except for 1975. However, examination of shipment data over a period of ten years shows major increases in volumes shipped of these beverage products in relation to population growth for the period. These beverage types would appear to contribute significantly to total beverage consumption of some segments of the population.

From apparent per capita consumption statistics, availability of nutrients derived from various food commodities can be calculated and have been reported by Shute. (1) Nutrient availability data are constrained by similar limitations to those described for disappearance data. However, assessment of selected nutrient availability statistics can provide an indication of trends at a national level over time.

Shute's data would indicate that, generally, per capita total energy disappearance or availability of calories derived from food has remained

(1) Shute, D.M., "The Nutritive Value of Food Consumption in Canada (1949-1971)," Canadian Farm Economics, 8(6):11, 1973.

relatively steady over 25 years but that the distribution of energy sources has changed among the food groups or commodities. Meat and poultry contribute significantly more to total food energy disappearance in recent years with more moderate increases in contribution from the food categories of fats and oils and pulses and nuts. Cereals as a group, dairy products, and sugar and syrups may be contributing less to total energy disappearance.

Based on disappearance data, the proportion of total calories contributed by protein in the diet has remained stable over many years although the mix of protein sources has changed. Although there has been a small increase in recent years in the proportion per capita of protein derived from pulses and nuts, animal products are still the dominant sources of protein in the Canadian diet. The major change in the apparent availability of macro nutrients in the diet is in the relative proportion of total calories contributed by carbohydrates and fats. Generally calories derived from carbohydrate sources, particularly starch sources, have decreased while calories contributed from fat sources have increased. Although vegetable sources of oils have increased in the importance to total visible oils consumed, the great increase in per capita meat consumption has been a major contributor to total dietary fat availability.

Apparent availability of vitamins and minerals based on per capita disappearance data does not show marked trends and is difficult to assess in terms of consumption in that the data do not account for losses which may occur during processing, storage or food preparation.

Food types that are not reported by Statistics Canada in apparent per capita disappearance data but that would appear to be major factors in national food consumption patterns have been assessed in terms of trends in volumes shipped in relation to national population growth for the corresponding time period. Significant increases are found in shipments of manufactured and processed products such as prepared cake mixes and other prepared dough mixes, food drink crystals, snack foods, and potato chips. Processed convenience products such as ready-to-serve meals including frozen precooked complete dinners have shown increases in proportion of volumes shipped in excess of relative population growth for the same time period. On the other hand, powdered dessert products including jelly powder and pudding and pie-filling powders have shown general declines in volumes shipped over the past few years.

Another major segment of change in the food industry that no doubt affects patterns of food consumption is the growth of food prepared away from home. Apparent food disappearance data do not differentiate between food consumed at home and food consumed away from home. However, the growth of this food-serving sector is reflected in the trend in recent years to increased per capita spending in restaurants and franchised food-serving outlets. Volume of sales and diversity of food items available through vending machines have shown substantial growth in recent years and are more indications of the change in food consumption patterns towards more eating away from home.

To a degree these general trends and observations are supported in assessing food purchase data from a national survey done in 1969 and a more limited update in 1974. Analysis of distribution of food expenditure per person indicates declining allocation of purchase dollars to dairy products and bakery and cereal products, and increased spending on visible fats and oils. A greater proportion of food dollars was spent on the purchase of frozen foods and food away from home in 1974 than in 1969.

Food expenditures per person vary regionally, by family size (as family size increases the per person expenditure decreases), by family income (as family income increases greater purchasing is evidenced of food purchases away from home, prepared or partially prepared dishes and of frozen foods).

From assessment of food expenditure data, it is evident that it is necessary to go beyond proportion of food dollars spent and examine the quantities purchased of the food items within the commodity groups to fully understand the consumption implications. As incomes increase and technology provides more processed and manufactured foods, more attention needs to be given to these types of food items.

The Nutrition Canada survey has provided information on nutrient intake of a representative sample of Canadians from all regions of the country for the years 1970 to 1972. Energy intakes do not appear excessive, yet almost half the adults in Canada are overweight, presumably as a result of sedentary living. Energy intakes of some adolescents and adult women are sufficiently low as to compromise the adequacy of their diets with respect to other nutrients. Protein is consumed at adequate levels by all age groups. The per cent of energy supplied by fat in diets of all age groups is higher than desirable. Many persons of all ages consume less than adequate amounts of iron and folic acid. Diets of some children and adolescents provide less than desirable amounts of calcium and vitamin D. Intakes of thiamin and riboflavin are inadequate for small numbers of adults, especially among the elderly. Intakes of vitamin C are at or above adequate levels for most of the population.

Although some differences in food consumption patterns were found among regions from Nutrition Canada survey data, distribution of nutrient intakes tended to follow similar patterns in all regions and for all seasons.

There has, as yet, been no published analysis of data from Nutrition Canada on nutrient intake and food consumption patterns in relation to income, size of family, and other socio-demographic factors, nor have correlations between food consumption patterns and nutrient intake been explored.

Information on nutrient intakes of Canadians in dietary studies prior to Nutrition Canada is limited to a small number of studies of local groups. Although data are insufficient to permit definite conclusions concerning trends in nutrient intake in the last two or three decades,

some changes are cautiously suggested. In comparison with the situation 30 to 35 years ago, average caloric intakes of children and adult men appear to be somewhat greater, of adolescent females to be slightly lower and of adolescent boys and adult females to be unchanged. Proportional calories provided by protein and fat appear to be unchanged. Average intakes of iron and calcium seem to be in the same range as those of three decades ago while intakes of vitamin C have increased. Intakes of thiamin and vitamin D have improved in comparison to those reported earlier.

Based on the preceeding review and assessments of available data relating to trends and food consumption and nutrient intake some broad implications have been drawn. These implications have led to developing a perspective for consideration and evaluating the need and direction of a food policy for Canada.

The number of food choices and alternative foods available to Canadians has increased markedly during the past 25 years. Some major shifts have occurred in food consumption patterns and these apparently vary by region, family size, income, lifestyle, etc. The nutritional impact of these shifts for specific segments of the population is not known nor are the reasons for the shifts readily apparent. However, it would appear that generally Canadian diets are shifting to more expensive food sources which are not necessarily the most appropriate nutritionally, nor the most beneficial economically in terms of nutrient supply. In terms of health and quality of life, the issues in food consumption appear to be selective and not general.

From the perspective of health and its long-term economic and quality-of-life consequences, some Canadians were apparently engaging in unsound food choice practices 25 years ago. In the intervening 25 years, the number of Canadians engaging in unsound food choice practices would appear to have increased and the general quality of food-choice practices to have declined.

It is essential if the long-term quality of life of Canadians resulting from unsound food choice decisions is to be improved, that an understanding of food practices of consumers and their reasons must be evolved and a program to alter food choice behavior developed. A food policy to be effective at the consumer level must address itself to aspects of altering food-choice patterns of segments of the population as well as concentrating on problems of food supply, distribution and productivity. A program aimed at altering the food choices of those groups of people who are jeopardizing present and future health and consequent quality-of-life expectations must make specific segments of Canadians aware of health-related inadequacies of their food choice patterns. Following the development of awareness, these groups must then be educated, motivated and persuaded to voluntarily change their food choice patterns from those currently followed to food choice patterns which are both lower in health risk and more economical in food cost.

Towards achieving these objectives the following recommendations are made:

- 1 Identify more precisely those segments of Canadians who are jeopardizing their health and quality of life as a consequence of food selection patterns. Identification of these segments should be based on psychographic as well as demographic measures to facilitate interpretation of the reasons behind food choice behavior based on attitudes, beliefs and knowledge towards foods, nutrition and health.
- 2 Based on the psychographic and demographic profiles of the various population segments identified, develop, test and implement models for selectively modifying food consumption behavior and nutrient intake patterns of those Canadians who are following unsound food practices.
- 3 Develop a planned and integrated information system to consistently measure changing patterns of food consumption and nutrient intake over time in order to assess progress in altering food choice behavior and provide feedback to modify and improve programs designed to selectively alter consumer food selection behavior.

The development of a national food policy must recognize the need for selectivity in dealing with inadequate food consumption patterns and not attempt to treat all Canadians alike, for indeed, with respect to food consumption and its health and quality-of-life consequences, they are different.

A comprehensive and detailed review of recent and current studies of food consumption patterns of Canadians and trends in nutrition in Canada does not exist. Periodic studies have been reported, but the sampling in many cases has been limited to specific segments of the population or geographic localities. National data on apparent food consumption are generally available only through Statistics Canada and for nutritional status through the Nutrition Canada survey. It is critical in assessing the need for and direction of development of a food policy for Canada that the changing patterns of food consumption and nutrient intake by Canadians be assessed. It is equally imperative that a critical review of existing knowledge be made to facilitate identification of areas of need for future research in the closely related areas of food consumption trends and nutritional well-being.

It is with these objectives in mind that this project was initiated by the Food Policy Advisory Group, Consumer and Corporate Affairs Canada. The focus of the project is identification and critical assessment of existing published and accessible data regarding trends in food consumption and nutrient intake, mainly confined to Canadian sources. Published statistics on national apparent food consumption, food expenditure, food purchases, nutrient intake and food consumption survey data have been examined. In Part I of this report, data on apparent food consumption, where available and as reported by Statistics Canada, have been assessed for trend implications for the period 1950 to 1975. Part II deals with food purchase data and Part III with trends in nutrient intake. National periodic surveys have been reported for food purchase in 1969 (supplementary in 1974 for urban centres) and Nutrition Canada in 1972. Although trends cannot be determined from these survey data, examination of reported materials has allowed assessment of consumption habits and nutritional status of population segments.

Part IV presents an overall assessment of the available information on food consumption and nutrient intake trends and their implications in considering development of a national food policy. This discussion is followed by a priority listing of research needs that will, if undertaken, lead to more definitive trend studies in the future for tracking and assessing food consumption habits and nutritional status of Canadians.

An annotated bibliography of literature relating to Canadian food consumption and nutrient intake has been compiled as part of this report. The compilation is based on a computer key word bibliographic research of appropriate literature and document bases augmented by a manual search of periodicals and documents held by the library of the University of Guelph. In addition, recent graduate student theses in related areas from several Canadian universities have been listed.

The bibliography is not considered as fully comprehensive nor reflecting an exhaustive search, but it does present a general picture of research and reported studies in the areas of food consumption and nutritional status in Canada over the past 25 to 30 years.



TRENDS IN APPARENT FOOD
DISAPPEARANCE AND NUTRIENT
AVAILABILITY

1. Trends Based on Food Disappearance Data

Estimates of annual apparent per capita disappearance of food in Canada have been reported by Statistics Canada for many commodities since 1926. At times, however, Statistics Canada has modified or added reported categories and historic data for these categories are not complete. Over the years, methods of reporting some groups have altered and it appears that data collection and reporting is generally complete only since 1947. Thus compared to the U.S., which has data reported on estimated apparent per capita disappearance back to 1909, Canada has available a relatively short history of information on which trends can be assessed. In this paper changes over the 25 years from 1950 to 1975 will be discussed where information for this period is available.

Statistics Canada is presently revising the data of many of the time series categories to develop a common format of reporting historical per capita disappearance from 1948 to the present. Target date for completion of these revisions is the latter part of 1977.

National average consumption for major items is developed from apparent domestic disappearance data for each of the food or commodity groups. Domestic disappearance of food represents the calculated difference between commodity supply figures, including domestic production and imports, and total figures representing identified sources of commodity utilization. The difference between these two sets of figures is assumed to represent the quantity of food or commodity "consumed" by the total population. Per capita estimates of domestic availability of food or apparent consumption are derived from net food figures representing the supply of food leaving the wholesale level and destined for retail distribution. These food consumption statistics represent food used in the economic sense and are not a measure of food actually eaten. However, they are useful in presenting a national picture of average per capita consumption over a period of time as well as at a particular point in time. By comparison of data over several years, trends in patterns of apparent food consumption may be identified.

Although useful in identifying macro trends in food consumption, disappearance data do not reveal the complete story. Consumption by various socio-economic groups or geographic segments cannot be identified from these statistics. The data do not measure or account for food wastage, trimming losses or storage losses which may occur at store level or in households, institutions or restaurants. However, given these limitations, changing patterns of apparent food consumption can be assessed from per capita consumption data and estimated nutrient levels calculated and studied to identify trends in availability and sources of nutrients. Trend data observed from these sources must be interpreted with caution. As Anderson (1) points out, "an opinion or hypothesis arising from examination of trends in food disappearance can only be substantiated by careful investigation of nutritional health through detailed clinical, biochemical and dietary studies".

PART I

TABLE I

Apparent Consumption Per Capita, 1950-1975

Year	Cereals ^a	Sugar & Syrup ^a	Pulses & Nuts ^a	Fats & Oils Excluding Butter ^a	Oils & Fats Including Butter ^a	Meat ^e
1950	100.0	100.0	100.0	100.0	100.0	100.0
1951	98.1	101.2	108.9	95.7	94.2	100.5
1952	96.1	102.3	107.9	99.1	95.0	102.8
1953	92.4	99.8	89.9	96.9	93.7	105.4
1954	94.1	99.9	86.1	97.1	93.3	107.5
1955	91.9	110.4	97.4	98.9	94.1	110.0
1956	93.8	105.8	125.3	100.7	95.6	112.3
1957	89.5	100.5	105.4	97.9	93.4	109.2
1958	92.1	104.4	93.8	103.1	94.1	109.1
1959	88.0	104.6	91.6	110.6	96.3	111.9
1960	89.0	99.5	96.4	110.7	94.0	114.6
1961	88.0	102.5	97.9	118.8	93.7	112.0
1962	86.8	107.0	98.3	112.8	97.0	112.4
1963	90.8	102.8	95.8	111.2	98.6	114.9
1964	84.0	105.6	116.7	111.4	98.5	120.0
1965	94.5	107.4	104.3	108.4	95.9	120.3
1966	86.9	110.9	113.3	126.8	104.5	122.2
1967	86.5	107.1	85.3	131.3	105.3	126.4
1968	86.3	108.6	91.5	134.6	106.3	127.9
1969	88.5	108.3	91.0	139.0	107.2	126.4
1970	88.1	109.8	87.2	137.9	106.7	129.9
1971	84.3	111.7	105.1	138.8	106.9	135.5
1972	88.3	107.7	109.6	146.8	109.9	132.5
1973	87.5	114.5	94.1	148.1	108.0	127.6
1974	90.7	91.6	123.3	155.0	111.1	130.4
1975	92.1	87.5	131.2	153.9	107.8	128.8

1950 = 100

a Retail Weight

e Dressed carcass weight

TABLE 1 (cont'd)

Year	Poultry ^f	Fish ^g	Eggs	Total Milk Equivalent	Fruits ^{b,c}	Vegeta- bles ^{b,c,d}
1950	100.0	100.0	100.0	100.0		
1951	112.5	98.2	101.3	97.2		
1952	135.8	98.4	112.5	96.1		
1953	123.5	99.8	116.1	96.6		
1954	134.2	98.0	121.2	96.1		
1955	117.6	98.7	122.0	97.1		
1956	124.2	97.9	121.9	98.4		
1957	125.5	98.0	126.4	98.2		
1958	133.7	98.0	123.0	92.5	100.0	100.0
1959	147.0	96.8	118.2	89.1	108.3	96.8
1960	134.4	92.1	116.8	85.8	102.4	101.9
1961	151.1	89.9	115.0	83.1	97.7	105.1
1962	150.7	85.9	114.2	85.5	95.9	105.9
1963	160.3	104.8	109.0	87.9	98.9	96.4
1964	170.6	94.4	108.7	87.4	102.2	97.1
1965	178.0	95.4	107.7	86.6	103.1	104.5
1966	191.5	94.4	104.1	84.6	106.3	107.3
1967	198.2	83.8	106.1	82.8	110.2	106.8
1968	193.7	89.3	106.4	81.3	106.4	108.4
1969	209.9	92.2	108.8	79.6	108.8	101.9
1970	219.8	87.6	110.2	79.0	104.5	109.7
1971	216.7	83.4	108.6	79.2	108.6	105.6
1972	221.3	98.5	104.5	78.3	108.6	101.4
1973	228.0	89.5	98.9	76.6	113.7	109.9
1974	221.2	91.9	96.5	76.7	120.6	116.2
1975	204.5	93.6	94.3	71.7	123.4	114.6

a Retail Weight

b Excluding Tomatoes

c Fresh Equivalent

d Excluding Potatoes and Mushrooms

e Dressed Carcass Weight

f Eviscerated Weight

g Edible Weight

Source:

Based on Statistics Canada data

Annual per capita disappearance data by selected major commodity groupings for the period 1950-1975 are shown in Table 1, indexed for most categories to 1950=100. Data for fruit and vegetables are indexed to 1958=100 because the time series reported by Statistics Canada on the current basis of reporting for these categories began in 1958. Some general observations can be made from these summary data. Detailed examination of each category will be reported in subsequent sections.

One major trend in food consumption that has developed in Canada during this century, as in many other Western countries, and appears to be particularly prominent during the past 25 years is the relatively large increase in per capita consumption of meats, both red meats and poultry, as a proportion of all foods consumed. A second and pronounced trend is the increase in per capita consumption of visible fats and oils. Concurrent with these two upward trends in consumption is the generally declining trend in the proportion of cereal grains and starch-source commodities as well as the relatively sharp decrease in total milk equivalent apparently consumed. The remaining categories have fluctuated in trend pattern or have shown marginal change during the 25-year period. As a result of changing trends in foods consumed, the level of nutrients available per capita through these food sources will undergo change which may have potential national consequences to the nutritional well-being of the population.

1.1. Cereals

As shown in Table 1 and in detail in Table 2, the apparent consumption of all cereals including breakfast food has fluctuated but generally declined since 1950 with a slight upturn in consumption occurring in 1974 and 1975.

Comparing the year 1950 to 1971, the annual per capita consumption of cereals declined by about 27 pounds or just under 16 per cent of all cereals consumed in 1950. Estimated annual consumption of cereals has increased subsequently by 13 pounds per person comparing level of consumption in 1971 to that in 1975. This represents an increase of just over 9 per cent. This recent increase has been primarily through increased consumption of wheat flour and breakfast food.

This recent rise in per capita consumption of breakfast food is apparently the result of a change in reporting of the statistics for this item rather than a real increase in amount of breakfast food consumed. For 1974 and 1975 infant cereals have been included in the breakfast food category, whereas they were excluded in previous years. Recalculation of historic data is being done by Statistics Canada to bring the older data in line with the most recent years reported.

The major component of the cereals grouping is wheat flour, comprising in 1975 about 85 per cent of all cereals domestically consumed as foods. Per capita consumption of wheat flour, which has declined by close to 13 per cent since 1950, is therefore the major factor contributing to the decrease in consumption of the cereal grouping of commodities. The greatest single use of wheat flour is in the baking of bread either

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TABLE 2

Per Capita Domestic Disappearance of Cereals^a,
1950-1975

Year	Wheat Flour	Rye Flour	Oatmeal & Rolled Oats	Pot & Pearl Barley	Cornflour & Meal	Buckwheat Flour	Rice	Breakfast Food	Total Cereal
pounds									
1950	155.83	0.28	6.05	0.32	0.84	0.10	4.06	5.36	172.84
1951	151.34	0.28	6.28	0.28	0.77	0.08	4.76	5.85	169.64
1952	150.52	0.41	5.52	0.27	0.64	0.07	3.04	5.72	166.19
1953	143.78	0.56	5.14	0.27	0.56	0.07	4.11	5.24	159.73
1954	145.49	0.77	5.62	0.33	0.52	0.06	4.63	5.19	162.61
1955	142.17	0.89	4.79	0.23	0.67	0.06	4.47	5.50	158.78
1956	143.89	0.85	5.39	0.25	0.79	0.06	5.09	5.90	162.22
1957	137.16	0.94	5.19	0.24	0.79	0.06	4.28	6.07	154.73
1958	141.15	1.01	4.90	0.19	1.11	0.05	4.38	6.33	159.12
1959	134.37	0.99	4.86	0.18	1.39	0.05	4.02	6.19	152.05
1960	134.90	1.03	4.83	0.20	1.68	0.05	4.47	6.73	153.89
1961	133.85	0.94	4.97	0.18	1.80	0.04	3.54	6.86	152.18
1962	132.32	0.91	4.80	0.15	1.70	0.04	3.41	6.65	149.98
1963	137.87	0.92	4.97	0.15	2.15	0.05	3.99	6.94	157.04
1964	125.86	0.89	5.18	0.13	2.47	0.04	3.91	6.71	145.19
1965	141.24	0.87	5.03	0.12	3.00	0.04	6.06	6.94	163.30
1966	130.29	0.84	4.55	0.07	3.23	0.04	4.23	6.91	150.16
1967	129.21	0.79	4.62	0.15	3.90	0.04	4.35	6.50	149.56
1968	129.47	0.77	3.77	0.09	4.08	0.02	4.54	6.46	149.20
1969	133.76	0.82	3.43	0.09	4.08	0.03	4.39	6.44	153.04
1970	131.69	0.81	3.98	0.11	4.15	0.02	4.96	6.62	152.34
1971	123.98	0.84	3.77	0.09	3.98	0.02	6.82	6.22	145.72
1972	130.87	0.88	3.78	0.11	4.65	0.02	6.18	6.22	152.71
1973	129.75	0.81	2.70	0.11	5.50	0.02	6.16	6.22	151.27
1974	132.14	0.87	3.11	0.11	5.54	0.01	5.10	9.90	156.78
1975	135.74	0.87	3.20	0.08	4.63	0.02	5.36	9.24	159.14

^a Retail weight

Source:

Statistics Canada, Apparent Per Capita Domestic
Disappearance of Food in Canada, Catalogue No.
32-226.

commercially or, to a much lesser extent, at home. The pattern of per capita consumption of bread over the same time period parallels, not unexpectedly, the decline in wheat flour consumption. Annual per capita bread consumption declined by 25 per cent between 1950 and 1972, the last year for which per capita bread consumption was reported. (2) This level of decrease in bread consumption represents about sixty 24 ounce loaves per average-sized household per year, fewer being consumed in 1972 compared to close to 25 years previously. Unfortunately, domestic disappearance data for wheat flour do not reveal trends in the proportion that is being consumed as whole wheat flour compared to white flour.

Although wheat flour consumption has shown generally steady decline for 25 years, some of the minor components of the cereals group have shown marginal increases in consumption. Over this period an increasing trend is evident particularly for corn flour and corn meal, and for rice. An evident but perhaps not unexpected trend is the general decline in the consumption of oatmeal and rolled oats to a low point in 1973. The annual per capita consumption of these oat products decreased from about 6 pounds in 1950 to just under 2 $\frac{3}{4}$ pounds in 1973. For the years 1974/75, this downward trend appears to have stabilized. The decline in the use of oat products is probably the result of the prevalent trend in recent years away from preparation and serving of a hot breakfast, one of the prime uses of oatmeal and rolled oats in the past. During the past two decades in many households, according to U.S. data, cold ready-to-eat cereal or no cereal may be consumed at breakfast. (3,4) On the other hand, per capita breakfast food consumption as reported by Statistics Canada had remained relatively steady between 5 to just under 7 pounds per person per year until 1974 when per capita consumption was reported to be over 9 pounds per person, primarily as the result of including infant cereals in this item in 1974 and 1975. The figures for apparent consumption of breakfast food mask the change that has taken place in the nature of prepared and ready-to-eat breakfast foods over this period; the shift from flaked, whole grain cereals to processed, sugar sweetened, flour based cereals during the 50's and 60's. Judging from the marketplace, there would appear to be a manufacturing trend, at least in part, back to processed, whole grain breakfast foods.

A study (5) of Regina teenagers in 1968 showed that 10 per cent of boys and 18 per cent of girls surveyed reported usually having no breakfast. Of those usually having breakfast half of the boys and one-third of the girls included cereal as a breakfast food. However, only one-fifth of the boys eating cereal and one-tenth of the girls used whole grain varieties.

1.2. Sugar

Annual average per capita consumption of refined sugar by Canadians has not increased appreciably over the past 25 years. Data reveal an increase of about 2.5 per cent based on five-year averages from the early 50's to the early 70's. Level of apparent consumption of sugar peaked in 1973 at about 107 pounds per person per year followed by a sharp decline in 1974 and 1975. Apparent consumption per capita in

these latter two years was about 91 and 87 pounds respectively. These data are shown in Table 3.

Relative to the more or less stable consumption pattern of refined sugar (up to the most recent two years) a more significant change is the increasing trend of total sugar consumption including sugars and syrups of other types and from sources other than cane or beet sugar. Sugars such as glucose (dextrose) and invert sugar are often used as sweetening agents or for functional purposes in manufactured food products. By inclusion of these types of sugars and syrups with sucrose, maple sugar and honey, per capita consumption of all sugars had increased by the early 70's by about 8 per cent compared to the early 50's. This increase represented about $8\frac{1}{2}$ pounds of sugars and syrups per person per year based on averages of per capita consumption during 1951-1953 and 1969-1973. During 1974 and 1975 and concurrent with the sharp decline in apparent consumption of refined sugar, other types of sugar (exclusive of maple sugar) also showed a sharp drop in apparent consumption. The net result is a major change in pattern of apparent consumption of all sugars and syrups with a decline in 1975 of some 23 per cent less sugar apparently consumed per capita than in the recent peak consumption year in 1973. The recent ban of artificial sweeteners may have an effect in subsequent years on this lower level of apparent consumption. As these figures represent a national average for each year, some segments of the population will be consuming sugars at a lower level (and increasing use was being made of artificially sweetened products in recent years by certain segments of the population) while others in the population will be consuming quantities of sugars in excess of these average figures.

1.3. Pulses and Nuts

The apparent consumption of pulses and nuts, which are a source of protein in the diet, has remained relatively constant over the past several years until 1974/1975. These statistics are detailed in Table 4. A generally decreasing trend in apparent consumption of dry peas and dry beans has occurred until the most recent two or three years reported, when consumption of these items increased markedly. Consumption of peanuts has been increasing somewhat during the early 70's with a sharp increase to nearly 9 pounds per person per year in 1975. This increase is reflected in reported sharp rise (nearly 18 per cent) in apparent per capita consumption of peanut butter in 1975 compared to 1974. However, as a commodity group the consumption level of pulses and nuts has remained quite constant until recent years.

1.4. Fats and Oils

As shown in Table 1 and Table 5, per capita consumption of visible fats and oils excluding butter has increased markedly during the past 25 years. An increase of nearly 54 per cent in apparent consumption of this group of commodities has been experienced since 1950 due primarily to significantly increased usage of salad oils, shortening and shortening oils, and to some extent increasing use of margarine. However, if butter is included in this grouping of visible fats and oils, the level of apparent per capita increase in fats and oil consumption in

TABLE 3

Per Capita Domestic Disappearance of Sugar and Syrups^a, 1950-1975

Year	Refined Sugar	Maple Sugar Pounds	Honey	Others	Total
1950	103.31	1.39	2.01	N/A	106.71
1951	97.18	1.03	2.90	5.64	106.75
1952	97.80	1.49	2.13	5.64	107.06
1953	95.23	0.40	1.76	5.63	103.02
1954	94.99	0.93	1.56	5.61	103.09
1955	96.81	0.79	1.94	13.67	113.21
1956	95.79	0.90	1.65	8.73	107.07
1957	92.30	0.62	2.16	8.62	103.70
1958	93.57	0.76	1.88	8.94	105.15
1959	94.02	0.60	2.01	8.43	105.06
1960	91.96	0.67	1.76	8.46	102.85
1961	89.41	0.70	1.72	6.98	98.81
1962	92.82	0.89	1.68	8.82	104.21
1963	89.49	0.75	1.93	10.13	102.30
1964	97.83	0.35	1.77	10.04	109.99
1965	99.22	0.51	2.25	9.02	111.00
1966	100.92	0.90	1.71	8.61	112.14
1967	99.00	0.53	2.05	8.89	110.47
1968	100.80	0.65	1.77	9.26	112.48
1969	98.48	0.20	1.81	8.27	108.76
1970	100.37	0.24	2.16	10.22	112.99
1971	102.08	0.21	1.56	10.69	114.54
1972	101.85	0.53	1.71	10.76	114.85
1973	107.74	0.72	1.74	9.57	119.77
1974	91.28	0.46	1.74	2.18	95.66
1975	87.34	0.31	1.91	1.81	91.37

^a Retail weight

Source:

Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Catalogue No. 32-226

N/A Not Available

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TABLE 4

Per Capita Domestic Disappearance of Pulses
and Nuts^a, 1950-1975

Year	Dry Peas	Baked Canned Beans	Dry Beans	Peanuts	Tree Nuts	Total Pulses & Nuts
			pounds			
1950	2.13	6.64	2.15	4.80	1.17	16.89
1951	2.67	6.54	4.05	4.06	1.07	18.39
1952	2.29	6.33	4.40	4.07	1.13	18.22
1953	3.43	6.27	4.17	1.31	15.18
1954	1.62	6.02	1.20	4.36	1.34	14.54
1955	2.14	5.58	3.10	4.58	1.05	16.45
1956	4.63	6.30	4.30	4.75	1.18	21.16
1957	2.32	5.96	3.72	4.50	1.31	17.81
1958	1.75	5.90	2.92	4.22	1.05	15.84
1959	1.74	6.17	1.95	4.29	1.33	15.48
1960	2.50	5.95	2.11	4.50	1.23	16.29
1961	2.44	6.51	2.31	4.12	1.15	16.53
1962	2.67	5.97	1.73	5.14	1.09	16.60
1963	2.52	6.26	1.90	4.39	1.11	16.18
1964	4.22	6.38	3.22	4.77	1.12	19.71
1965	2.24	6.13	2.55	5.50	1.20	17.62
1966	1.14	6.24	5.62	4.97	1.16	19.13
1967	1.95	5.55	5.72	1.19	14.41
1968	0.81	5.79	2.17	5.47	1.22	15.46
1969	1.37	5.58	1.92	5.17	1.34	15.38
1970	1.74	5.07	1.52	5.07	1.33	14.73
1971	2.99	5.25	2.78	5.23	1.50	17.75
1972	1.59	5.93	3.79	5.28	1.92	18.51
1973	0.94	5.61	1.32	5.95	2.07	15.89
1974	2.68	5.54	4.83	5.81	1.97	20.83
1975	2.42	6.01	3.16	8.79	1.78	22.16

^a Retail weightSource:
Statistics Canada, Apparent Per Capita Domestic
Disappearance of Food in Canada, Catalogue No.
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TABLE 5

Per Capita Domestic Disappearance of Fats and Oils^a, 1950-1975

Year	Margarine ^b	Butter ^b	Lard	Shortening & Shortening Oils ^b	Salad Oils ^b	Total Fats & Oils Including Butter	Fats & Oils Excluding Butter
pounds							
1950	6.81	22.90	9.6	9.33	1.93	50.57	27.67
1951	7.62	21.16	9.3	8.18	1.38	47.64	26.48
1952	7.68	20.64	9.8	8.31	1.63	48.06	27.42
1953	7.40	20.59	8.8	9.12	1.50	47.41	26.82
1954	7.54	20.34	7.4	10.07	1.85	47.20	26.86
1955	7.99	20.22	8.3	9.63	1.44	47.58	27.36
1956	7.71	20.45	8.8	9.69	1.68	48.33	27.88
1957	7.80	20.18	8.3	9.11	1.87	47.26	27.08
1958	8.47	19.07	8.4	9.55	2.12	47.61	28.54
1959	8.69	18.07	10.1	9.20	2.62	48.68	30.61
1960	9.33	16.91	9.1	9.32	2.87	47.53	30.62
1961	10.03	16.46	8.5	9.19	3.22	47.40	30.94
1962	9.86	17.85	8.0	9.62	3.73	49.06	31.21
1963	9.22	19.08	7.6	9.93	4.03	49.86	30.78
1964	8.87	18.98	7.7	10.27	4.00	49.82	30.84
1965	8.67	18.52	7.2	9.85	4.28	48.52	30.00
1966	8.90	17.76	6.8	12.76	6.64	52.86	35.10
1967	9.11	16.93	7.9	13.79	5.52	53.25	36.32
1968	9.44	16.50	7.7	14.09	6.01	53.74	37.24
1969	9.68	15.75	7.6	15.33	5.86	54.22	38.47
1970	9.32	15.79	7.8	15.26	5.78	53.95	38.16
1971	9.24	15.66	8.2	15.06	5.92	54.08	38.42
1972	9.69	14.94	7.6	16.60	6.74	55.57	40.63
1973	9.84	13.64	6.7	17.49	6.95	54.61	40.97
1974	10.72	13.29	7.5	17.04	7.63	56.18	42.89
1975	11.58	11.92	6.1	17.39	7.81	54.53	42.61

^a Retail weight^b Source:
Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Catalogue No. 32-226

1975 compared to 1950 is reduced to 8 per cent. This is because margarine is apparently substituting more and more for butter, and apparently spreads in total are being consumed less in the 70's than in the 50's.

As Pando (6) has pointed out, the reduction in consumption of butter over the period 1949 to 1968 was not the result of a continuous decline. The pattern showed many ups and downs during this period. Pando shows that at least some of the fluctuations were the result of transitory factors, such as high rate of unemployment and the subsidy on butter, that altered the trend of per capita consumption of butter during the period 1958 to 1966. By isolating the influence of these two factors from the actual pattern of consumption, a relatively smooth declining trend in consumption of butter is shown to occur.

The ratio of margarine to butter consumption has altered from 1:3.0 in the early 50's to 1:1.6 in the early 70's. The trend of increasing substitution of margarine for butter has continued into 1974 and 1975. Consumption of margarine has increased by about 36 per cent based on five-year average figures from the early 50's to the early 70's with the largest average increase in margarine consumption occurring during the early 60's. A decline of 28 per cent in per capita consumption of butter occurred during the same period. Concurrently, consumption of lard has decreased. At the same time the historic trends of increasing apparent consumption of shortening and of shortening and salad oils have continued. On the other hand, the total of visible fats and oils consumed including butter appears to have stabilized in the last few years at about 55 pounds per person per year.

Not only has there occurred a major change in the mix of visible fats and oils apparently consumed by Canadians over the past 25 years, but a significant change has occurred in the nature of the source of the fats and oils.

Vegetable sources are providing an increasingly larger proportion of fats and oils consumed. This increase in vegetable source fats and oils is due largely to the increase in use of salad and cooking oils, the shift from lard to shortening and the increased substitution of margarine for butter. With the increase in proportion of vegetable fats and oils consumed, the proportion of animal source fats as visible fats has declined, particularly lard and butter.

In general, the increase in apparent consumption of fats and oils may be attributed not only to the increased usage of fats and oils in cooking and food preparation in home, but to the increase in fast food preparation out of home and also diversification of manufactured and processed products incorporating these materials as ingredients.

1.5. Meat, Poultry, Fish and Eggs

Meat consumption by Canadians, particularly of red meats and poultry, has shown a substantially increasing trend over the past 25 years as reflected in Tables 1, 6 and 7. Total red meat consumption has

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TABLE 6

Per Capita Domestic Disappearance of Meats^a,
1950-1975

Year	Beef	Pork	Veal	Mutton & Lamb	Offal	Canned Meat ^{b,c}	Total Meats
				pounds			
1950	50.66	54.85	9.4	2.2	4.9	3.97	125.98
1951	49.18	58.41	7.6	2.0	4.7	4.74	126.63
1952	54.23	55.85	6.9	2.2	5.2	5.14	129.52
1953	64.88	48.54	8.1	2.4	5.0	3.91	132.83
1954	69.97	45.26	8.6	2.5	4.8	4.32	135.45
1955	68.98	49.07	8.4	2.6	5.3	4.33	138.68
1956	71.20	49.03	8.5	2.6	5.2	5.01	141.54
1957	71.75	44.26	8.9	2.6	5.14	4.92	137.57
1958	67.85	49.24	7.3	2.7	4.8	5.60	137.49
1959	65.41	56.54	6.9	2.9	4.9	4.28	140.93
1960	69.80	52.48	6.9	2.9	4.8	7.46	144.34
1961	70.55	50.30	6.8	3.5	4.5	5.42	141.07
1962	71.10	50.06	7.1	3.8	4.3	5.27	141.63
1963	74.32	50.70	6.5	4.0	4.0	5.20	144.72
1964	79.39	51.79	7.2	3.4	3.9	5.47	151.15
1965	83.58	47.86	8.3	2.85	3.6	5.43	151.62
1966	84.02	49.99	6.9	3.9	3.6	5.51	153.92
1967	83.45	54.51	7.0	4.2	3.9	6.24	159.30
1968	85.68	53.49	6.8	4.9	3.7	6.61	161.18
1969	86.31	51.42	5.1	5.0	3.8	7.57	159.20
1970	84.39	58.75	4.6	4.6	3.4	7.91	163.65
1971	89.13	68.30	4.7	3.3	4.4	.85	170.68
1972	92.54	60.98	3.5	4.7	4.1	1.14	166.96
1973	91.79	57.61	3.15	3.71	3.60	.94	160.80
1974	94.72	59.85	3.49	2.53	3.70	--	164.29
1975	102.26	48.43	5.36	2.86	3.42	--	162.33

a Dressed carcass weight

b Dressed carcass and offal equivalent

c Source:

Z.A. Hasson, D.T. Karamchandani. Handbook of Food Expenditures, Prices and Consumption,
Ottawa: Economics Branch, Agriculture Canada,
1976.

Statistics Canada, Catalogue No. 32-226

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TABLE 7

Per Capita Domestic Disappearance of Poultry^a,
1950-1975

Year	Chicken	Fowl	Fowl & Chicken	Turkey	Duck	Goose	Total Poultry
pounds							
1950			17.09	2.93	0.21	0.31	20.54
1951			19.48	3.14	0.19	0.30	23.11
1952			23.24	4.00	0.32	0.33	27.89
1953			20.62	4.12	0.30	0.33	25.37
1954			21.56	5.47	0.30	0.23	27.56
1955			18.82	4.94	0.23	0.17	24.16
1956			19.12	5.98	0.24	0.17	25.51
1957			19.28	6.10	0.25	0.14	25.77
1958			21.01	5.99	0.30	0.16	27.46
1959			21.90	7.83	0.30	0.16	30.19
1960			20.78	6.34	0.32	0.16	27.60
1961			23.00	7.60	0.28	0.15	31.03
1962			22.85	7.65	0.31	0.14	30.95
1963	19.62	4.56	24.18	8.29	0.30	0.15	32.92
1964	21.25	4.68	25.93	8.62	0.33	0.17	35.05
1965	22.09	4.49	26.58	9.46	0.35	0.18	36.57
1966	24.05	4.45	28.50	10.31	0.34	0.18	39.33
1967	25.74	4.13	29.87	10.34	0.32	0.19	40.72
1968	25.64	3.91	29.55	9.74	0.31	0.18	39.78
1969	29.37	3.31	32.68	9.99	0.29	0.15	43.11
1970	31.32	3.30	34.62	10.05	0.31	0.16	45.14
1971	29.89	3.72	33.61	10.34	0.37	0.19	44.51
1972	31.40	3.06	34.46	10.41	0.40	0.18	45.45
1973	32.80	3.29	36.09	10.18	0.37	0.19	46.83
1974	31.02	3.20	34.22	10.50	0.56	0.15	45.43
1975	29.00	2.98	31.98	9.46	0.51	0.06	42.01

^a Eviscerated weightSource:
Statistics Canada, Apparent Per Capita Domestic
Disappearance of Food in Canada, Catalogue No.
32-226.

increased by over 28 per cent comparing apparent consumption in 1950 to that in 1975, or an increase of about 35 pounds of meat per person per year. Of the red meats over this time period, beef has increased in importance of total red meat consumption from close to 40 per cent of all red meats consumed to 63 per cent. Generally the level of pork consumption has remained relatively unchanged as a proportion of all red meats consumed, varying from a low of 32 per cent to a high of 40 per cent. However, during the early 70's pork consumption tended to increase to a high consumption level of 68 pounds per person per year in 1971. Consumption in subsequent years has declined to the latest reported per capita figure of 48 pounds in 1975. Mutton and lamb, although tending to increase in consumption rate, continue to represent a small proportion at under 2 per cent in 1975 of the total red meats consumed.

Consumption of canned meat, based on cold dressed carcass plus offal equivalent, for the reported years 1950 to 1970 appears to have remained quite steady at generally 4 to 6 pounds per person per year.

Apparent per capita poultry consumption based on eviscerated weight has more than doubled in the 25 years since 1950 and represented in 1975 about 42 pounds per person per year. The increase has been primarily through much greater consumption of both fowl and chicken and in recent years a more rapid growth in chicken consumption. Although less in proportion of total poultry consumed, a major increase in the consumption of turkey has been experienced particularly during the late 60's and early 70's as compared to the consumption level of turkey during the 50's. (Table 7)

Duck and goose provide the remaining, relatively minor, proportion of domestic per capita poultry consumption.

Referring to Table 1 and Table 8, Canadian fish consumption has remained at about the same level for 25 years. Approximately $12\frac{1}{2}$ to $13\frac{1}{2}$ pounds of fish per person are consumed annually. Generally more fresh and frozen fish including shellfish are being consumed today, with a general decrease in the consumption of canned, smoked, salted, and pickled fish.

Egg consumption based on fresh egg equivalent, as shown in Table 9, has fluctuated over the past 25 years from a peak of 37 pounds per person per year experienced in 1957 during a period of relatively high egg consumption. Lowest consumption level of eggs reported over the 25-year period was in 1975 at just under 28 pounds or about $18\frac{1}{2}$ dozen per person per year.

Over the period 1950-1975, beef, chicken and turkey have shown the most pronounced growth in consumption rate of the four classes of commodities, meat, poultry, fish and eggs, which represent major protein sources in the Canadian diet.

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TABLE 8

Per Capita Domestic Disappearance of Fish^a,
1950-1975

Year	Fish & Shellfish Fresh & Frozen	Fish Cured (Smoked, Salted, Pickled)	Fish & Shellfish Canned ^b	Total
		pounds		
1950	6.79	2.26	4.62	13.67
1951	6.85	2.18	4.40	13.43
1952	6.81	2.15	4.49	13.45
1953	6.88	2.08	4.69	13.65
1954	7.03	1.92	4.45	13.40
1955	7.25	1.80	4.44	13.49
1956	7.13	1.74	4.51	13.38
1957	6.88	1.89	4.63	13.40
1958	7.51	1.84	4.05	13.40
1959	7.53	1.83	3.88	13.24
1960	7.65	1.80	3.14	12.59
1961	7.74	1.57	2.98	12.29
1962	7.54	0.92	3.28	11.74
1963	9.57	1.33	3.43	14.33
1964	8.75	0.73	3.42	12.90
1965	9.08	1.02	2.94	13.04
1966	8.44	0.70	3.77	12.91
1967	7.24	1.01	3.20	11.45
1968	8.29	0.94	2.98	12.21
1969	8.24	0.88	3.48	12.60
1970	7.44	0.77	3.76	11.97
1971	6.67	0.84	3.89	11.40
1972	7.29	0.96	5.21	13.46
1973	7.39	0.64	4.20	12.23
1974	7.50	0.66	4.41	12.57
1975	8.38	0.66	3.75	12.79

a Edible weight.

b Excludes herring and fish used for bait.

Source:

Statistics Canada, Apparent Per Capita Domestic
Disappearance of Food in Canada, Catalogue No.
32-226.

TABLE 9

Per Capita Domestic Disappearance of Eggs^a,
1950-1975

Year	Eggs
	pound
1950	29.48
1951	29.86
1952	33.18
1953	34.22
1954	35.72
1955	35.97
1956	35.93
1957	37.28
1958	36.26
1959	34.86
1960	34.45
1961	33.91
1962	33.67
1963	32.15
1964	32.04
1965	31.74
1966	30.70
1967	31.27
1968	31.38
1969	32.08
1970	32.48
1971	32.02
1972	30.82
1973	29.15
1974	28.46
1975	27.80

^a Fresh eggs.

Source:

Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Catalogue No. 32-226.

1.6. Dairy Products

As demonstrated in Table 1, dairy products as a group, in terms of total milk equivalent, have declined sharply in apparent consumption over the past 25 years--a decrease of about 28 per cent comparing per capita consumption in 1950 to that in 1975. However, as shown in Table 10, there has been a counter-trend in several dairy-based products, particularly cheese, cottage cheese, ice cream and in recent years yogurt.

The decline in annual per capita butter consumption has already been discussed. Creamery butter represents by far the major source, over 96 per cent, of total butter apparently consumed in 1975. Other sources are farm butter which has declined to a trace as a source and whey butter, which although representing only slightly over 3 per cent of total butter consumed in 1975 has shown a growth rate of 143 per cent from 1950 to 1975. (Table 11)

The reverse to the decline in butter consumption has been the increase in apparent consumption of cheese of all kinds. Annual per capita consumption of cheese, including cheddar, processed and other varieties made from whole milk and cream, has trended consistently upward since 1950 with a slight decline reported in 1975 compared to 1974 data. Annual per capita total cheese consumption has increased nearly 183 per cent over the 25-year period. Although the three categories of cheese, cheddar, processed and other varieties, have all increased in apparent consumption, the most rapid rate of increase has been experienced by those cheeses other than cheddar and processed. In 1950 this category accounted for 11.3 per cent of per capita total cheese consumption excluding cottage cheese and in 1975 the same category accounted for 35.2 per cent. (Table 11)

As a sub-category of cheese, cottage cheese consumption has trended generally upward from 0.59 pounds per person per year reported in 1950 to a level of 2.24 pounds consumed annually per person in 1975. Over the past four years, apparent consumption of cottage cheese would appear to have stabilized at about 2 $\frac{1}{4}$ pounds per person per year.

Concentrated milk products have shown interesting trends over the 25 year period, 1950-1975. (Table 12) Concentrated milk by-products based on skim milk and including powdered, evaporated and condensed skim milk have nearly doubled in apparent consumption, whereas similar concentrated products based on whole milk have declined by about 50 per cent. This declining trend for concentrated whole milk products has accelerated since the late 60's and into the 70's. Although the per capita consumption of total concentrated milk products has declined slightly, the more evident trend has been the substitution of skim milk concentrated by-products for whole milk concentrated products with concentrated milk by-products representing about 50 per cent of all concentrated products consumed in 1975 on a per capita basis compared to about 23 per cent in 1950. The mix of concentrated milk by-products

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TABLE 10

Per Capita Domestic Disappearance of Butter,
Cheese, Concentrated Milk Products and Fluid
Milk, 1950-1975

Year	Butter ^a total	Cheese ^b total	Cottage Cheese	Concentrated Milk By-products ^c	Concentrated Whole Milk Products ^d	Ice Cream	Fluid Milk ^{e,f}	Total ^{g,h}
			pounds			gallon	pounds	
1950	22.90	5.57	0.59	5.88	19.23	1.71	390.75	1,041.77
1951	21.16	5.69	0.68	6.54	19.86	1.80	384.14	1,012.50
1952	20.64	5.80	0.65	5.84	20.22	1.88	381.13	1,001.14
1953	20.59	6.16	0.74	6.35	20.62	1.93	385.60	1,006.18
1954	20.34	6.34	0.81	7.01	20.33	1.86	386.07	1,001.07
1955	20.22	6.61	0.88	7.36	20.46	2.06	393.39	1,011.42
1956	20.45	6.39	1.11	7.38	21.30	2.06	401.35	1,025.00
1957	20.18	6.73	1.14	7.68	20.73	2.11	381.94	1,022.89
1958	19.07	6.83	1.12	8.85	20.06	2.14	370.40	963.41
1959	18.07	6.96	1.23	9.34	19.62	2.28	356.00	927.87
1960	16.91	7.18	1.25	8.89	20.08	2.30	345.86	893.58
1961	16.46	7.45	1.31	10.98	19.14	2.36	332.34	865.83
1962	17.85	8.06	1.37	10.12	19.25	2.37	326.16	891.23
1963	19.08	8.28	1.45	11.76	19.05	2.47	322.69	915.73
1964	19.98	8.62	1.53	11.89	18.27	2.56	320.58	911.11
1965	18.52	9.10	1.56	11.53	17.75	2.62	316.92	902.39
1966	17.76	9.19	1.59	12.80	17.29	2.67	311.81	881.38
1967	16.93	9.82	1.61	11.50	16.54	2.74	303.34	863.12
1968	16.50	10.36	1.65	12.33	16.00	2.69	294.68	846.90
1969	15.75	11.26	1.84	14.77	14.68	2.76	287.06	829.66
1970	15.79	11.80	2.04	10.94	13.75	2.80	274.19	823.06
1971	15.66	12.60	2.18	10.16	13.49	2.78	271.62	825.26
1972	14.94	13.18	2.26	9.92	12.87	2.80	274.10	815.46
1973	13.64	14.43	2.42	10.07	12.44	2.75	274.45	798.09
1974	13.29	16.12	2.27	10.63	11.50	2.73	272.90	799.14
1975	11.92	15.85	2.24	10.94	10.65	2.78	262.91	752.71

a Includes creamery, farm and whey butter.

b Includes cheddar, processed and other cheese.

c Includes skim milk powder, evaporated skim milk and condensed skim milk.

d Includes evaporated, condensed and powdered milk.

e Includes fluid sales plus milk cream consumed in the farm home.

f Newfoundland excluded.

g Newfoundland excluded from fluid milk, but included for all other products.

h In terms of milk.

Source:

Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Catalogue No. 32-226.

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TABLE 11

Per Capita Domestic Disappearance of Butter and Cheese^a, 1950-1975

Year	Butter			Cheese			
	Creamery	Farm	Whey	Cheddar	Processed	Others ^b	Cottage Cheese
1950	20.14	2.00	0.16	2.31	2.63	0.63	0.59
1951	19.11	1.91	0.14	2.15	2.78	0.76	0.68
1952	18.96	1.56	0.12	2.19	2.83	0.78	0.65
1953	19.19	1.28	0.12	2.39	3.01	0.77	0.74
1954	19.13	1.08	0.13	2.61	3.01	0.76	0.81
1955	19.17	0.95	0.11	2.88	2.93	0.83	0.88
1956	19.45	0.86	0.14	2.56	2.82	1.03	1.11
1957	19.28	0.76	0.14	2.85	2.79	1.10	1.14
1958	18.24	0.71	0.14	2.75	2.93	1.15	1.12
1959	17.30	0.63	0.15	2.70	2.97	1.29	1.23
1960	16.19	0.56	0.17	2.83	3.08	1.27	1.25
1961	15.78	0.48	0.20	2.88	3.15	1.42	1.31
1962	17.23	0.40	0.22	3.28	3.28	1.47	1.37
1963	18.53	0.32	0.23	3.25	3.41	1.63	1.45
1964	18.49	0.25	0.24	3.40	3.56	1.66	1.53
1965	18.10	0.19	0.23	3.41	3.82	1.86	1.56
1966	17.35	0.17	0.25	2.93	4.21	2.04	1.59
1967	16.57	0.16	0.27	3.35	4.15	2.32	1.61
1968	16.07	0.15	0.28	3.34	4.35	2.67	1.65
1969	15.34	0.14	0.27	3.60	4.60	3.06	1.84
1970	15.32	0.13	0.28	4.14	4.49	3.27	2.04
1971	15.22	0.11	0.33	4.11	4.74	3.75	2.18
1972	14.50	0.10	0.34	4.20	5.21	3.77	2.26
1973	13.25	0.08	0.31	4.92	5.51	4.00	2.42
1974	12.93	--	0.36	4.52	5.70	5.67	2.27
1975	11.53	--	0.39	4.44	5.61	5.58	2.24

^a Retail weight^b Other cheese comprises all varieties made from whole milk and cream except cheddar.

Source:

Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Catalogue No. 32-226.

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TABLE 12

Per Capita Domestic Disappearance of other Dairy Products^a and Fluid Milk, 1950-1975

Year	Concentrated Milk By-Products			Concentrated Whole Milk Products				
	Skim Powder	Evaporated Skim	Condensed Skim	Evaporated	Condensed	Powder	Ice Cream	Fluid ^b Milk
1950	3.41	0.87	0.33	pounds 17.43	0.80	0.44	1.71	390.75
1951	3.70	0.64	0.43	17.81	0.76	0.36	1.80	384.14
1952	3.50	0.71	0.33	18.29	0.76	0.35	1.88	381.13
1953	4.40	0.73	0.28	18.47	0.86	0.35	1.93	385.60
1954	4.68	0.83	0.26	18.00	0.81	0.34	1.86	386.07
1955	5.11	0.58	0.28	18.33	0.76	0.19	2.06	393.39
1956	5.07	0.54	0.26	18.59	0.93	0.31	2.06	401.35
1957	5.40	0.55	0.21	18.13	0.84	0.27	2.11	381.14
1958	6.41	0.58	0.20	17.65	0.85	0.19	2.14	370.40
1959	6.92	0.44	0.22	17.17	0.82	0.22	2.28	356.00
1960	6.85	0.15	0.14	17.47	0.80	0.27	2.30	345.86
1961	8.39	0.34	0.11	16.57	0.81	0.18	2.36	332.34
1962	7.14	0.29	0.10	16.52	0.86	0.15	2.37	326.16
1963	8.07	0.37	0.07	16.16	0.95	0.27	2.47	322.69
1964	7.94	0.38	0.05	15.66	0.91	0.15	2.56	320.58
1965	7.06	0.38	0.06	15.23	0.97	0.20	2.62	316.92
1966	8.16	0.42	0.10	14.96	1.11	0.06	2.67	311.81
1967	6.84	0.52	0.06	14.20	1.19	0.23	2.74	303.34
1968	7.81	0.69	0.06	13.78	1.24	0.15	2.69	294.68
1969	10.09	0.65	0.07	12.74	1.01	0.14	2.76	287.06
1970	6.24	0.61	0.07	12.12	0.78	0.05	2.80	274.19
1971	5.04	0.79	0.08	11.82	0.74	0.08	2.78	271.62
1972	4.73	1.04	0.08	11.19	0.78	0.08	2.80	274.10
1973	5.18	0.92	0.11	10.48	0.91	0.13	2.75	274.45
1974	5.67	0.89	0.12	9.67	0.84	0.06	2.73	272.90
1975	6.07	0.97	0.09	8.80	0.73	0.08	2.78	262.91

a Retail weight

b Includes fluid sales plus milk and cream consumed in farm homes.

Source:

Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Catalogue No. 32-226.

consumed per person per year has remained about the same over 25 years with skim milk powder representing annually 55 to 65 per cent of the total category.

Annual per capita total fluid milk consumption continued to decline over the 25-year period although the decline in consumption appeared to have stabilized in the early 70's. However in 1975, reported per capita consumption was again just over $3\frac{1}{2}$ per cent lower than that reported for 1974. The decline in fluid milk consumption for the year 1975 compared to 1950 represents a decrease of just under 33 per cent. Based on per capita disappearance of milk solids in 1975, fluid whole milk represented 87.6 per cent of total fluid milk solids apparently consumed, followed by fluid partly skimmed milk representing 11.3 per cent and fluid skim milk at less than 1 per cent.

Where provincial data are reported on per capita consumption of dairy products, fluid milk and cream are consumed at slightly below the national average daily level in New Brunswick (7) and in Nova Scotia (8). In 1958, apparent consumption in New Brunswick was 12.7 per cent lower than the national average and in Nova Scotia 16.3 per cent lower. Although the national average as well as the average of each of the provinces declined, by 1971 the decrease in daily fluid milk and cream consumption was much more pronounced in New Brunswick (17.9 per cent lower than the national average) than in Nova Scotia (3.2 per cent higher than the national average.) Prince Edward Island (9) has consistently shown higher per capita daily milk and cream consumption than the national average although a decline in consumption has occurred also in this province. From 1958 to 1971, daily per capita consumption of fluid milk and cream in Prince Edward Island declined by about 28 per cent but in 1971 was 16.4 per cent above the national average.

Ice cream has continued to show an increasing trend in gallonage apparently consumed per person per year with an increase of close to 63 per cent over 25 years.

Ware (10) in 1966 observed that consumers are willing to buy butterfat in other forms than whole milk and may have become more price conscious as far as fluid milk is concerned. This same observation may extend into the 70's after examination of trends in apparent consumption of dairy products.

1.7. Fruits and Vegetables

In 1958 the method of reporting apparent disappearance data for fruits and vegetables was changed. Although data for years prior to 1958 are being recalculated by Statistics Canada on the current reporting basis, the only reported per capita consumption statistics on which trend examination can be made is for the period 1958-1975.

Based on fresh fruit equivalent, consumption of fruits, excluding tomatoes, has increased in total by just under 12 per cent comparing per capita consumption figures of the early 70's to those of the early 60's. As shown in Table 13, the increasing trend has resulted in

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TABLE 13

Per Capita Domestic Disappearance of Fruits^a,
1958-1975

Year	Fresh	Canned ^b	Frozen ^b	Juice ^b	Dried ^b	Jams, Jellies Marmalades	All Others ^b	Total ^b
pounds								
1958	95.8	17.8	2.1	39.2	19.8	2.0		176.7
1959	105.7	18.1	2.3	42.6	20.7	1.9		191.3
1960	96.4	18.3	2.3	44.0	17.8	2.1		180.9
1961	94.6	20.1	2.4	39.3	14.5	1.8		172.7
1962	89.6	17.6	2.7	42.7	14.7	2.2		169.5
1963	98.3	16.9	2.9	38.8	15.8	2.1		174.8
1964	97.2	16.4	3.8	37.8		2.1	23.3	180.6
1965	98.2	20.8	3.6	35.7		2.2	21.7	182.2
1966	97.8	18.8	3.2	38.9		2.0	27.1	187.8
1967	103.2	20.4	3.5	47.8		2.0	18.0	194.8
1968	96.9	18.3	3.2	46.4		1.8	21.5	188.1
1969	102.9	18.2	3.2	51.3		1.7	14.9	192.2
1970	100.7	15.7	3.2	49.3		1.7	14.1	184.7
1971	103.37	18.7	3.09	50.58		1.65	14.56	191.95
1972	106.88	17.14	3.40	44.60	13.37	1.55	5.10	192.04
1973	110.53	17.67	3.21	53.08	13.68	1.49	1.34	201.00
1974	113.64	17.46	2.92	62.34	10.89	1.53	4.37	213.15
1975	119.74	16.64	3.09	57.41	12.47	1.42	7.29	218.06

^a Excluding tomatoes.^b Fresh equivalent.

Source:

Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Catalogue No. 32-226.

part from increased fresh fruit consumption, probably as a result of improved distribution methods and general year-round availability of fresh produce. In addition, a relatively major increase (greater than 25 per cent) has occurred, particularly in the early 70's, in per capita consumption of fruit processed to fruit juice. Although average apparent per capita consumption of fruit processed by canning has remained more or less static for a 15-year period, frozen fruits, representing only about 18 per cent of the consumption of volume of canned fruit in 1975, has shown proportionately a much greater increase in rate of annual per capita consumption. However, the rate of growth of frozen fruit apparent consumption experienced through the early 60's has become almost static in the 70's.

Citrus fruit consumption, which in 1975 represented nearly 34 per cent of per capita total fruit consumption (based on fresh fruit equivalent) and excluding tomato, has increased by 16 per cent on average from the early 60's to the early 70's. This increase was the result of increases of about equal proportion in consumption of both fresh citrus fruits and citrus fruit processed to juice.

Apples in all forms (fresh, canned, juice, frozen, dried and sauce) in 1975 represented on fresh equivalent basis about 20 per cent of all fruit excluding tomatoes consumed per person. This was an increase on a comparable basis from just over 17 per cent in 1974, largely due to increased apparent consumption of apple juice.

Per capita consumption of bananas was about 9 per cent of all fruits consumed per person in 1975, about the same level as reported in 1974. In terms of apparent per capita disappearance of fruit, the next largest category reported was grapes which, in 1975, represented close to 6 per cent of all fruits consumed per person.

As shown in Table 1, vegetables (excluding potatoes, tomatoes and mushrooms) experienced a relatively slow but directional increase in per capita consumption over a 15-year period from 1958. Per capita consumption in 1975 was reported to be about 14 per cent greater than that in 1958. As seen in Table 14, apparent consumption of fresh vegetables (excluding potatoes) showed a general decline from 1958 but with a major change in direction starting in 1973. Fresh vegetables in 1973 represented about 66 per cent of apparent per capita total vegetable consumption and in 1975 this figure had increased to 76 per cent.

Per capita consumption of canned vegetables and frozen vegetables increased about 26 per cent and 442 per cent respectively when comparing apparent consumption in 1958 to 1974. However, reported figures for 1975 showed relatively major declines in per capita consumption of both of these processed forms with a concurrent increase in consumption of fresh vegetables.

In 1975, on a fresh equivalent basis, major vegetable types, excluding potatoes and mushrooms, reported to be consumed as a per cent of per capita total vegetable consumption were carrots (16.8 per cent),

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TABLE 14

Per Capita Domestic Disappearance of Vegetables^a,
1958-1975

Year	Fresh	Canned ^b	Frozen ^b	Other Uses ^b	Total ^b
			pounds		
1958	76.4	21.1	2.1	8.9	108.5
1959	78.1	21.1	1.8	4.0	105.0
1960	80.0	19.9	4.3	6.4	110.6
1961	75.8	19.7	4.0	14.5	114.0
1962	75.4	22.2	3.3	14.0	114.9
1963	70.9	19.5	6.0	8.2	104.6
1964	66.3	20.5	5.7	12.9	105.4
1965	71.3	23.4	7.2	12.0	113.4
1966	75.0	20.7	8.7	12.0	116.4
1967	72.5	21.2	8.6	13.6	115.9
1968	75.6	25.0	7.1	9.9	117.6
1969	70.5	24.5	8.2	7.4	110.6
1970	77.6	23.5	9.8	8.1	119.0
1971	69.8	26.39	9.51	8.84	114.57
1972	70.70	23.89	9.30	6.12	110.01
1973	78.73	27.86	9.41	3.22	119.22
1974	87.89	26.77	11.40	N/A	126.06
1975	94.41	21.97	7.96	N/A	124.34

a Excluding tomatoes, potatoes and mushrooms.

b Fresh equivalent.

Source:

Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Catalogue No. 32-226.

lettuce (14.6 per cent), corn (14.5 per cent--with canned corn representing 67.8 per cent of this figure), onions (11.0 per cent), cabbage (10 per cent), peas (4.4 per cent--about equally divided between canned and frozen forms).

Over a 15-year period from the early 60's to the mid 70's, apparent total per capita potato consumption has experienced annual fluctuations but, averaged over 5-year periods, has remained fairly constant at about 152-154 pounds per person per year. The statistics reported for potatoes in Table 15 represent the latest revised figures from the Agricultural Division of Statistics Canada. Reported apparent consumption of white potatoes in 1975 represented a major increase of 25 per cent over the level reported for 1974.

Per capita consumption of tomatoes in total, based on fresh equivalent, had remained relatively unchanged over the past 15 years until 1973 when apparent total tomato consumption increased sharply. However, the mix of tomato based products consumed, Table 16 has altered with an increasing trend of consumption of processed tomato products (pulp, paste, puree and catsup) and a generally declining trend in fresh tomato consumption, although per capita fresh tomato consumption may have stabilized in recent years at 10 to 12 pounds per year.

1.8. Beverages

Over the past 25 years, the pattern of beverage drinking inferred from disappearance data would tend to indicate a stabilization of tea and cocoa per capita consumption based on tea leaf and green bean equivalents, respectively. Somewhat less tea is reported consumed today than in the early 50's. However, coffee consumption, based on green bean equivalent, reflects a generally consistent increasing trend with just under 54 per cent more coffee apparently consumed in 1975 compared to the level consumed in 1950. These statistics are summarized in Table 17.

Annual per capita consumption of other beverage products was not reported by Statistics Canada until 1974. However, some consumption trends can be inferred indirectly by comparing gallonage sales or shipments over a time span versus population growth for the same period. It is recognized that this method of inference does not account for gallonage of various beverages imported or exported and hence reported growth figures may be inflated or deflated from actual growth.

Based on gallonage shipped, carbonated soft drinks including bottled, canned and bulk showed an increase of 65 per cent comparing shipment figures for 1964 to those for 1974 (11). Over the same period, population growth was 16.3 per cent. In 1975, per capita consumption of soft drinks was reported by Statistics Canada to be 13.8 gallons per year.

Alcoholic beverages and wines showed increases in gallonage sales of 59 per cent and 141 per cent respectively between 1966 and 1975 (12). Gallonage sales of beer, for the same two years, increased 51 per cent.

TABLE 15

Per Capita Domestic Disappearance of Potatoes^a,
1958-1975

Year	White	Sweet	Total
	pound		
1958	162.13	0.53	162.66
1959	151.67	0.56	152.23
1960	161.99	0.52	162.51
1961	144.65	0.46	145.11
1962	159.78	0.49	160.27
1963	149.54	0.49	150.03
1964	153.50	0.44	153.94
1965	136.62	0.49	137.11
1966	139.46	0.45	139.91
1967	171.79	0.38	172.17
1968	148.28	0.40	148.68
1969	167.80	0.38	168.18
1970	150.63	0.45	151.08
1971	159.14	0.48	159.62
1972	159.87	0.55	160.42
1973	150.35	0.57	150.92
1974	142.60	0.73	143.33
1975	178.22	0.62	178.84

^a Fresh equivalent.

Source:

Statistics Canada, Agricultural Division

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TABLE 16

Per Capita Domestic Disappearance of Tomatoes^a,
1958-1975

Year	Fresh	Canned ^a	Juice ^a	Pulp, Paste & Puree ^a	Catsup ^a	Other Uses ^a	Total
pounds							
1958	17.2	9.7	10.2	4.7	6.9	12.2	60.9
1959	18.1	9.4	11.2	3.2	7.4	11.4	60.7
1960	17.6	9.5	11.0	4.4	8.0	8.8	59.3
1961	17.8	11.2	11.1	2.8	8.0	7.7	58.6
1962	16.8	9.9	12.6	4.7	7.4	8.2	59.6
1963	13.4	9.9	13.4	11.1	8.8	4.6	61.2
1964	13.4	9.9	10.9	5.8	7.9	5.9	53.8
1965	12.4	9.7	10.5	10.2	10.7	7.4	60.9
1966	11.7	9.0	10.7	10.5	9.7	3.3	54.9
1967	12.3	6.1	9.3	14.0	10.2	7.7	59.6
1968	11.3	9.7	9.7	14.7	10.3	4.8	60.5
1969	7.6	9.8	9.1	14.1	11.2	1.3	53.1
1970	12.6	10.4	8.9	10.0	11.0	7.1	60.0
1971	12.07	10.12	9.38	12.83	10.85	6.24	61.49
1972	11.13	9.58	11.89	11.84	10.92	0.47	55.83
1973	11.99	11.03	13.02	20.36	10.79	--	67.19
1974	10.55	11.61	13.59	16.67	12.62	16.32	79.45
1975	11.29	9.05	13.63	9.99	12.77	17.86	69.81

^a Fresh equivalent.

Source:

Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Catalogue No. 32-226.

TABLE 17

Per Capita Domestic Disappearance of Beverages,
1950-1975

Year	Tea ^a	Coffee ^b	Cocoa ^b
	pounds		
1950	4.00	6.15	3.33
1951	3.01	6.42	2.22
1952	3.15	6.95	2.70
1953	3.06	7.42	3.02
1954	2.91	6.44	2.94
1955	2.68	6.98	2.71
1956	2.83	7.40	2.59
1957	2.76	7.57	2.81
1958	2.55	7.98	2.49
1959	2.55	8.68	2.77
1960	2.40	8.36	2.86
1961	2.48	8.67	3.16
1962	2.28	9.14	2.79
1963	2.57	9.05	3.34
1964	2.48	8.77	2.76
1965	2.40	8.70	3.18
1966	2.28	8.11	2.68
1967	2.40	9.29	3.11
1968	2.50	9.54	3.08
1969	2.10	8.99	3.05
1970	2.25	5.80	3.12
1971	2.43	8.95	3.50
1972	2.44	9.11	3.76
1973	2.48	9.29	3.81
1974	2.52	9.23	3.20
1975	2.47	9.45	2.95

a Tea Leaf equivalent,

b Green bean equivalent,

Source:

Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Catalogue No. 32-226.

Population growth from 1966 to 1975 was 13.9 per cent. Apparent consumption of beer, ale, stout and porter was reported by Statistics Canada as 19.4 gallons per person in 1975.

1.9. Conclusions

Major conclusions that can be derived from these statistics and trends of annual per capita consumption of the various food groups are:

- 1 On a national level, significant shifts in food consumption patterns both within and across the major commodity groups have occurred in Canada during the past 25 years.
- 2 Lower cereal grain consumption per capita has been accompanied by markedly increased consumption of visible fats and oils and consumption of significantly increased quantities of red meats, particularly beef, and of poultry.
- 3 Consumption of dairy products in total has declined over a 25-year period with a particularly significant decrease in fluid milk consumption, although consumption of some specialized or processed dairy products has increased.
- 4 Although consumption of total fruits and vegetables has increased, perhaps of greater prominence is the nature of the shift, at least up to most recent years, to generally increased consumption of processed fruits and vegetables and of imported fruits.
- 5 The types of beverages consumed, particularly over the past few years, would appear to have changed to increased consumption of coffee and increased consumption of soft drinks, beer, wine and other alcoholic beverages.

An additional trend that is generally believed to exist, but is not readily identifiable from disappearance data, is the increasing availability and purchase of processed and manufactured food products.

2. Apparent Nutrient Availability

Although recognizing the limitation of food disappearance statistics, gross trends can be identified in apparent consumption patterns of food groupings and commodities. In a similar manner, gross trends in estimated availability of nutrients can be identified by studying potential per capita nutrient intake data calculated from food disappearance statistics.

Shute (13) reported a study of estimated nutritive values of food consumption in Canada for the period 1949-1971. Values calculated by Shute for estimated supplies of energy and nutrients in foods available for consumption for the period 1949-1971 are shown in Table 18. From these data, the percentage contribution of food groups to total calories and nutrients available for consumption were compared for the years 1949 and 1971, as shown in Table 19.

Anderson (1) reported a similar study but used 1940 and 1974 as base years for comparison of energy disappearance distribution among food groups. Both studies conclude that calorie intake has remained

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TABLE 18

Estimated Supplies of Energy and Nutrients in
Foods Available for Consumption by Canadians
per Person per Day, 1949-1971

Year	Energy	Protein	Fats	Carbo- Hydrates	Ca	P
	Calories	Gm	Gm	Gm	Mg	Mg
1949	3007.2	82.9	126.0	392.1	989.9	1379.4
1950	3063.2	83.8	126.0	405.1	1007.5	1402.2
1951	2989.6	83.2	124.1	393.9	1005.5	1388.9
1952	3010.9	84.2	125.2	391.8	1006.2	1396.4
1953	2966.5	85.2	124.0	386.4	1025.5	1420.0
1954	2976.2	84.6	124.4	384.9	1025.2	1420.3
1955	3004.9	86.4	125.6	387.1	1045.1	1440.7
1956	3051.7	87.8	127.5	394.8	1048.8	1458.6
1957	2968.8	86.6	125.1	380.1	1054.5	1454.5
1958	3022.3	86.4	125.5	392.5	1044.7	1450.7
1959	3027.7	85.6	124.8	387.6	1035.1	1437.4
1960	2999.3	85.6	127.3	384.5	1022.2	1431.7
1961	2979.7	85.0	124.8	385.5	1019.1	1422.6
1962	2983.3	83.8	127.2	383.4	983.6	1396.8
1963	3001.9	85.6	128.0	383.8	988.2	1412.3
1964	2986.3	84.9	129.3	377.3	976.2	1480.5
1965	3076.7	88.2	127.6	400.2	974.3	1422.2
1966	3097.1	87.1	131.7	400.4	995.3	1435.3
1967	3081.1	87.2	134.2	389.0	964.0	1423.9
1968	3096.5	86.8	135.3	390.9	970.4	1435.1
1969	3139.1	88.4	137.8	393.1	996.6	1444.7
1970	3141.3	88.4	140.1	390.3	947.2	1424.6
1971	3173.7	89.2	143.2	391.1	934.0	1437.0

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TABLE 18 (cont'd)

Year	Iron Mg	Vit A I.U.	Thiamine Mg	Ribo- flavin Mg	Niacin Mg	Vit. C Mg
1949	11.6	6899.7	1.1	2.0	16.8	100.9
1950	11.7	7254.6	1.2	2.0	16.6	105.6
1951	11.6	7156.9	1.2	1.9	16.3	105.0
1952	11.9	7174.7	1.2	2.0	16.9	110.3
1953	12.0	7149.8	1.2	2.0	17.2	112.5
1954	11.9	7250.0	1.1	2.0	17.2	110.6
1955	15.9	7362.6	1.8	2.4	22.2	114.2
1956	16.3	7374.1	1.8	2.4	22.9	112.6
1957	16.1	7348.5	1.8	2.4	21.4	113.6
1958	15.7	6856.2	1.8	2.3	22.7	99.1
1959	15.5	6700.9	1.8	2.3	22.6	103.4
1960	15.6	6985.7	1.8	2.3	22.6	105.4
1961	15.5	6820.6	1.8	2.3	22.5	102.2
1962	15.3	6862.8	1.8	2.2	23.0	100.9
1963	15.5	6347.0	1.8	2.3	23.3	95.6
1964	15.3	6411.0	1.7	2.2	22.6	91.9
1965	16.1	6504.3	1.8	2.4	23.8	97.1
1966	16.1	6683.3	1.8	2.2	23.3	101.7
1967	16.0	6711.5	1.8	2.2	24.0	101.7
1968	16.1	6277.9	1.8	2.2	24.1	98.8
1969	16.0	6410.0	1.8	2.2	24.0	95.8
1970	16.4	6637.6	1.8	2.2	24.2	97.2
1971	16.5	6821.4	1.9	2.2	24.4	98.0

Source:
Based on Statistics Canada data. From D.M. Shute,
"The Nutritive Value of Food Consumption in
Canada (1949-1971)." Canadian Farm Economics,
8(6): 11, 1973.

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TABLE 19

Percentage Contribution of Food Groups to Total
Calories and Nutrients Available for Consumption
by Canadians per Person per Day, 1949 and 1971

	Calories		Protein		Fat		Carbohydrate		Calcium		Phosphorus	
	1949	1971	1949	1971	1949	1971	1949	1971	1949	1971	1949	1971
Cereals	25.4	20.8	26.8	21.2	2.1	1.5	40.6	35.4	4.2	3.9	15.2	12.2
Sugars & Syrups	17.5	17.1	a	a	--	--	34.7	35.9	1.6	1.6	a	a
Pulses & Nuts	1.8	2.9	3.5	5.4	2.3	3.6	1.5	2.4	1.4	2.4	4.0	6.6
Fruit	2.8	4.1	1.9	1.9	a	a	5.2	8.5	3.3	3.5	3.1	3.2
Vegetables	4.9	5.3	5.8	5.8	a	a	8.5	9.5	4.6	5.0	8.5	9.2
Oils & Fats	16.8	17.0	a	a	45.1	42.4	a	a	a	a	a	a
Meat	12.5	15.2	21.7	25.4	26.3	29.6	a	a	1.1	1.4	12.3	14.6
Poultry	1.0	2.6	2.8	7.4	1.8	4.2	a	a	a	a	1.5	3.7
Eggs	1.7	1.8	4.9	5.2	2.9	2.9	a	a	1.7	2.1	4.7	5.1
Fish	.9	.6	4.6	3.1	--	--	a	a	1.7	1.3	3.1	2.3
Dairy Products	13.7	11.7	27.7	24.3	17.7	14.2	7.6	6.7	77.7	75.5	44.3	39.4
Beverages	.8	.7	--	--	--	--	1.6	1.6	1.7	2.2	2.5	3.0
	Iron		Vitamin A		Thiamine		Riboflavin		Niacin		Vitamin C	
	1949	1971	1949	1971	1949	1971	1949	1971	1949	1971	1949	1971
Cereals	20.7	31.5	a	a	16.4	40.0	6.0	20.0	13.7	25.0	--	--
Sugars & Syrups	5.7	4.7	--	--	a	a	a	a	a	a	a	a
Pulses & Nuts	6.6	7.8	a	a	6.4	5.3	2.0	2.3	3.9	6.1	a	a
Fruit	8.6	7.9	10.7	12.4	8.2	6.9	3.0	3.6	4.2	3.8	39.1	43.1
Vegetables	15.5	11.5	39.0	41.6	20.0	13.3	6.5	5.9	17.3	12.7	53.4	50.7
Oils & Fats	--	--	17.3	15.0	--	--	--	--	--	--	1.0	a
Meat	25.9	22.4	13.9	11.9	30.0	21.0	15.0	15.4	29.8	24.2	--	--
Poultry	--	1.4	--	--	1.0	1.1	1.0	1.8	4.9	8.5	--	--
Eggs	6.4	5.0	5.5	6.2	2.7	2.1	5.0	5.0	a	a	--	--
Fish	2.0	1.1	a	a	1.3	a	1.5	a	4.8	2.6	a	a
Dairy Products	2.8	2.5	13.2	12.2	17.3	8.9	55.0	40.9	2.1	1.6	6.2	5.1
Beverages	4.9	4.2	--	--	--	--	3.0	2.3	19.0	15.7	--	--

a Less than one percent

Source:
Based on Statistics Canada data.
From D.M. Shute, "The Nutrient Value of Food
Consumption in Canada (1949-1971)" Canadian Farm
Economics 8(6): 11, 1973

relatively constant for the past 25 years and even, as Anderson points out, as far back as 1935. The total food energy consumed per capita is reported to be about 3000 kcal/day with a variation between the highest and lowest average intake between 1949-1971 of 207 kcal/day/person. There appears, however, to be a slightly rising trend in kilocalories consumed through the 70's, as shown in Table 18.

The distribution or contribution of energy disappearance across selected food groups is shown in Table 20.

Food groups contributing most to the total energy available are cereals, meat, sugar and syrups, and visible oils and fats.

Consistent with trends already observed, daily energy per capita contributed by cereals to total energy available has declined from 1940 compared to 1974 and energy contributed by meats and poultry has increased. Energy contribution from sugar and syrups would appear to remain fairly constant through 1940, 1949 and 1971 with a decline, according to Anderson's data, in contribution in 1974. The values reported by Shute for visible oils and fats for 1949 and 1971 are higher than those reported by Anderson for 1940 and 1974. No indication is given to determine if this is a real trend difference or a result of a difference in method of calculation. Similarly the data reported by Shute do not indicate if energy contributed by potatoes is included with that contributed by vegetables. If this were the case then corresponding figures by Anderson would show some decline in the role of vegetables and potatoes as a contributor to total energy since 1940.

Both authors report that as a percentage of total calorie disappearance, the contribution of protein has remained relatively stable at 11-12 per cent over several years even though the amount of meat consumed per person has increased. Although there has been some increase in recent years of protein from vegetable sources (pulses and nuts), animal products are still the dominant source of protein in the Canadian diet. The major change in distribution of macro nutrients is in the proportion of contribution of carbohydrates and visible fats to total calories. Anderson reports that carbohydrate has decreased from 54 per cent of the total calories consumed in 1935 to 47 per cent in 1974. Similar figures reported by Shute for carbohydrate are 52 per cent in 1949 and 49 per cent in 1971. Counter-balancing this decrease is an increase in the proportion of calories contributed by fats as a percentage of total calories. Anderson reports an increase from 34 per cent to 41 per cent for the years 1935 and 1974 respectively in comparison to Shute's figures of 38 per cent in 1949 and 41 per cent in 1971.

Shute also points out that the nature of the fats has changed with the contribution of vegetable fats to total visible oil and fat consumption increasing from about 37 per cent in 1949 to 58 per cent in 1971. Contribution from visible animal fats, primarily butter and lard, decreased from 63 per cent to 42 per cent for the same period. The increase in visible fats consumption is largely derived from vegetable oil sources such as tend to be used in margarine, shortening, salad

TABLE 20

Distribution of Energy Disappearance among Food Groups in Canada, 1949-1974

	(Per cent of total calories)			
	1940 ^a	1949 ^b	1971 ^b	1974 ^a
Cereals	26.0	25.4	20.8	21.2
Meat	12.0	12.5	15.2	18.7
Sugar and Syrups	18.0	17.5	17.1	14.3
Oil and Fats	14.0	16.8	17.0	15.3
Milk and Cheese	12.0	13.7	11.7	11.9
Fruits	6.0	2.8	4.1	4.3
Potatoes	7.0	N/A	N/A	4.2
Poultry	1.0	1.0	2.6	2.5
Pulses and Nuts	2.0	1.8	2.9	3.0
Eggs	2.0	1.7	1.8	1.6
Vegetables	1.0	4.9	5.3	1.3

^a Source:

G.H. Anderson, "Food Disappearance Trends and Nutritional Health in Canada," Canadian Home Economics Journal, 4(6), 1977.

^b Source:

D.M. Shute, "The Nutritive Value of Food Consumption in Canada (1949-1971)," Canadian Farm Economics, 8(6): 11, 1973.

and cooking oils. However, the amount of dietary fat contributed by meat and poultry increased about 20 per cent from 1949 to 1971 with these two categories of food contributing 33.8 per cent of total dietary fat in 1971.

In addition to the change over time in the proportion of vegetable oils consumed as visible fats, the nature of vegetable oils used in margarines and shortenings has shifted over the past 20-25 years. In 1950, the oils in heaviest use for these applications were cottonseed and soyabean oil (14). In Canada, in 1973, cottonseed oil had largely been replaced by rapeseed oil with an increase in the use of soyabean, palm and coconut oils. Anderson (1) discusses nutritional implications of the changing compositions of oils used in margarines and shortening relative to the degree of unsaturation of the fatty acids contained in the various oils.

Although it is difficult to discuss meaningfully trends in vitamin and mineral availability based on disappearance data, Shute's data do show major sources of selected minerals and vitamins across the various food groups. However, the effects of processing, storage and cooking losses on availability of nutrients actually consumed are unknown and cannot be accounted for in disappearance data. In addition, during the past 15 to 20 years, more products such as flour, certain milk products, margarine, etc. have been allowed to be fortified with certain minerals and vitamins, such as thiamin, niacin, riboflavin, calcium and iron in wheat flour and vitamins A and D in skim milk and margarine. An increase has occurred in the number of manufactured products such as fruit beverage crystals and breakfast cereals that have vitamins and minerals added.

The report of the Committee on Diet and Cardiovascular Disease (15) expresses the nutrient content of the Canadian diet as a percentage of the recommended daily intake of a male aged 19-35 years; the nutrient data are based on food disappearance data reported for 1941 and for 1972. It would appear that increases in availability of thiamin, riboflavin, niacin, vitamin B6 and vitamin C have occurred comparing these two years. The data would also indicate a minor increase in availability of folate but this is insufficient to meet the recommended daily intake level. Availability of vitamin E has also increased with a marginal decrease in vitamin A. Of the three minerals considered (calcium, iron and zinc), iron shows some increase from 1941 to 1972 with the other two minerals virtually unchanged. The increase in three of the B vitamins (thiamine, niacin, riboflavin) and vitamin C as well as iron is not unexpected considering the number of products that have been fortified for some years with these nutrients. The increase in availability of vitamin B6 could have resulted from the increase in per capita meat consumption. From these calculations based on disappearance data, the authors conclude that nutrient availability on an average per capita basis for this age group of men appeared to be adequate with the exception of folic acid which was low.

The Economics Branch of Agriculture Canada is reported to be in the early stage of calculating per capita nutrient availability from

revised food disappearance time series data for the period 1960-1975. The calculated nutrient availability information will include both macro and selected micro nutrients. As a second phase to this, the Economics Branch plans to calculate nutrient levels based on food expenditure survey data of 1969 and 1974. Both sets of data are planned to be reported in the latter part of 1977.

Through technological developments in food processing over the past 20 years, better methods of food and nutrient preservations are available. These developments together with improved and more efficient distribution methods should provide an opportunity for consumers to select a variety of food of high quality and with better nutrient availability than could be done 25 years ago.

3. Foods Not Included in Food Disappearance Data

3.1. Processed and Manufactured Foods

Data on food disappearance or per capita apparent consumption have been reported by Statistics Canada for few processed or manufactured foods. Some exceptions are breakfast foods, canned and frozen fruits and vegetables, canned meat, margarine, etc. In more recent years, Statistics Canada has extended some of the classifications of processed products reported to include pasta, peanut butter, pickles and sauces. In most cases however, the processing of these products has been conversion of a basic commodity into a modified form of food product. Generally for these types of processed foods, insufficient time series data exist to assess trends in apparent per capita consumption.

In the past 10 to 15 years an increasing number of more highly processed and manufactured products have been introduced to the Canadian market. In many cases these products represent convenience to the consumer in terms of reduced preparation and clean-up time. In some cases the manufactured product may substitute for a more traditional commodity food. Disappearance data reported by Statistics Canada do not cover this category of processed or manufactured product although commodity foods used in their manufacture will be reflected in disappearance statistics. However, by comparing Statistics Canada shipment data to population growth for a specific period of time, some inferences regarding gross consumption may be drawn.

There are several limitations to the use of shipment data. The data do not account for imports or exports of the product class. In many cases not all manufacturers of a food class may be represented in the data--usually the "larger establishments" reporting data are claimed to be reported in Statistics Canada tables of shipments. For some product categories and in some years the number of manufacturers may be limited; to preserve confidentiality, shipment data for a particular product or year may not be made public. Also, methods and detail of reporting may vary from period to period, hence there are some gaps and sometimes inconsistencies in detail of data reported for

some product categories. However, given these limitations, examination of shipment statistics for selected food products may give an indication of the nature of changes occurring in recent years with processed and manufactured food products. These changes may be the reflection of changing consumption habits and product choice.

Shipment data on prepared cake mixes have been reported for several years (16). Comparing tonnage shipped in 1974 to that shipped in 1964, there has been a 67 per cent increase; this level of increase in shipment of prepared cake mixes compares to a 16.3 per cent increase in the population for this same period. Hence the relative growth in production and shipment of prepared cake mixes for this 10 year period exceeds the corresponding change in population growth by over 4 fold. Related data for other prepared mixes such as doughnut and pancake mixes which were first reported by Statistics Canada in 1972 showed a marginal increase by 1974 of just over 2 per cent. However, in 1974 this category represented almost half of the tonnage reported shipped of prepared cake mixes, doughnut mixes, etc. combined.

Powdered dessert products including jelly powder, pie filling powder and pudding powder have shown negative growth in terms of shipments comparing data for 1974 to similar data for 1971 (16). Jelly powder volume has declined 1.3 per cent comparing these two years, pie filling powder showed a 15.9 per cent decline and pudding powder declined 4.0 per cent. The population increased by 4.0 per cent over this period. At least some of the decrease in these powdered dessert products, as reflected in reported shipment data, is perhaps accounted for in switching consumption to other dessert items--for example ice cream, fresh fruit, prepared cake mixes, all of which have been shown to be rising in apparent consumption, and the great variety of prepared and partially processed dessert choices generally available in the marketplace.

A synthetic beverage product, fruit drink crystals, has shown marked growth comparing shipment data for 1974 to that for 1971 (16). This type of product has increased in shipment volume by 36.6 per cent over this period while population growth for the same period of time was 4.0 per cent.

At the same time chocolate-based beverages, both hot chocolate and instant chocolate, have declined in shipment volume by 13.8 per cent with instant chocolate maintaining over 75 per cent of the total chocolate beverage category volume (16).

Canned, ready-to-serve meals containing meat and vegetables have shown a general increase in shipment volume since 1964 (17). Comparing tonnage shipped in 1973 to that for 1964 an increase of 132 per cent is indicated. Population increase for the period between these two years was 14.0 per cent. Shipment volume for this category declined somewhat (6.0 per cent) in 1974 compared to 1973. Ready-to-serve meals containing meat products such as stews, spaghetti, pork and beans, etc., as well as frozen pre-cooked complete dinners, including meat pies, have shown an increase of 20.7 per cent in shipped tonnage for 1974

compared to 1971 (18). The growth is reported to have been largely in the ready-to-serve products rather than in frozen pre-cooked complete meals. Canned soups of all kinds have shown continuous growth in volume for 25 years based on shipment data (17). Volume for this category in 1974 was 133 per cent greater than that reported for 1950 with a corresponding population growth for the period of 63.7 per cent. The relatively large increases in shipments of these types of processed products may represent some shift away from home preparation of foods to use of more convenience-oriented food products. Some of these types of products may also be used to a greater extent than in the past in certain sectors of the growing food-away-from-home segment of food consumption.

Snack foods, cheese, cereal and corn-based products, as well as potato chips, have shown markedly increased shipment tonnage in recent years where data are reported (16). Tonnage of snack foods shipped increased by 25.8 per cent from 1973 to 1974 and potato chips increased in tonnage shipped by 38.1 per cent from 1972 to 1974. Rates of growth in population for corresponding periods of time were 1.59 per cent and 2.86 per cent, respectively. Total chocolate confectionery has grown in tonnage shipped by close to 25 per cent comparing data for 1971 to that for 1964 (19). The data reported for 1974 represent a decline of about 12 per cent from the high level of shipment tonnage of chocolate confectionery reported for 1973. Population growth between 1964 and 1974 was 16.3 per cent.

Although not a manufactured or processed food as represented by the types of products discussed above, the rapid rise in reported shipment volume of ground beef and hamburger may, in part, be the result of heavier usage by consumers of "meat added" mix products. Tonnage of ground beef and hamburger shipped increased by close to 90 per cent between 1971 and 1974 (18). Some of the increased shipment tonnage may also have been the result of increasing meat prices during this period resulting perhaps in substitution for more expensive meat cuts. A large part of the greater volume of ground beef and hamburger available may also be attributed to the growth of certain segments of fast food or food-away-from-home establishments. This aspect of change in the food preparation and distribution chain will be discussed in the next section.

3.2 Food Away from Home

Although there are no data reported by Statistics Canada on the per capita consumption of food that is specifically prepared and eaten away from home, this sector of the food business represents a rapidly growing volume. Food disappearance data reflect apparent consumption of food in total which may be consumed either at home or away from home, but there is no method for differentiating the data between the two locations of consumption.

However, some idea of the growth of this sector of the food business, which affects food consumption pattern or is the result of changes in lifestyle may be gained by examining some measures of the industry.

Sales and other data are available on certain segments of the industry--restaurants, franchised food operations and vending machine outlets.

From Table 21 showing total restaurant receipts the percentage increase in sales for Canada comparing 1974 to 1966 was 64.3 per cent. The Maritime provinces, Quebec and Saskatchewan tended to be below the national average of sales growth with the remaining provinces somewhat above average and British Columbia showing the greatest rate of growth. Some of this growth in dollar receipts is the result of inflation but the figures also show a real increase in spending on meals in restaurants, particularly in some provinces. Per capita expenditure on restaurant food is shown in Table 21. The table also shows the percentage change in per capita expenditure for food in restaurants comparing 1974 to 1966. Most provinces are just about at or below the national average of just over 46 per cent increase for the period except Manitoba which shows a 67 per cent increase in per capita spending on food in restaurants during this time.

Franchised food-serving outlets are apparently an increasing factor in the food-away-from-home business. As shown in Table 22, national sales for this sector have increased by nearly 87 per cent from 1971 to 1973 with an increase in per capita sales of 82 per cent. Greatest sales growth over this two-year period was in Quebec followed by Alberta, Manitoba, British Columbia and Nova Scotia. The food franchise market in Ontario, which grew in sales volume at a lower rate than the national average for the period, was perhaps developed earlier than in other provinces judging from the relatively large number of outlets and below average rate of adding new outlets between the two years.

Another source of food availability outside the home is vending machines. Tables 23 and 24 show the growth in the number of vending machines and vending sales and the distribution of sales by product type. Vending sales nearly doubled comparing data for 1973 to that for 1966 with an increase of only about 24 per cent in the number of machines for the same period. Although each of the food categories represents a small part of the distribution of vending machine sales relative to tobacco, together they in general represent the fastest growing segments comparing 1973 data to that for 1966. Some of the most rapidly expanding categories are ice cream, canned hot foods and soups, hot and cold beverages including milk, and confectionery.

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PART I

TABLE 21

Total Restaurant Receipts and Per Capita Expenditure in Restaurants, 1966 and 1974

Province	Total Receipts			Per Capita Expenditure in Restaurants		
	1966	1974	Percentage Change 1974/1966	1966	1974	Percentage Change 1974/1966
	(\$000's)	(\$000's)		(\$)	(\$)	
Canada	1,078,352	1,771,505	+ 64.3	53.88	78.92	+ 46.5
Newfoundland	11,704	16,859	+ 44.0	23.74	31.11	+ 31.0
Prince Edward Island	3,255	4,048	+ 25.5	29.59	34.60	+ 16.9
Nova Scotia	25,512	37,871	+ 48.4	33.75	46.58	+ 38.0
New Brunswick	20,765	32,544	+ 56.7	33.65	49.16	+ 46.1
Quebec	364,555	574,620	+ 57.6	63.06	93.68	+ 48.6
Ontario	380,284	648,947	+ 70.6	54.63	80.18	+ 46.8
Manitoba	49,676	86,068	+ 75.3	51.58	86.12	+ 67.0
Saskatchewan	42,219	52,253	+ 23.8	44.21	57.61	+ 30.3
Alberta	77,850	134,953	+ 73.4	53.21	78.74	+ 48.0
British Columbia	102,562	182,342	+ 77.8	53.50	74.18	+ 38.7

Source:
Statistics Canada, Market Research Handbook,
Catalogue No. 31-212.

TABLE 22

Number and Sales of Franchise-Associated Food Serving Outlets, 1971 and 1973

Province	Number of Outlets		Total Sales			Per Capita Sales		
	1971	1973	1971	1973	Percentage Change 1973/1971	1971	1973	Percentage Change 1973/1971
			(\$000's)	(\$000's)		(\$)	(\$)	
Canada	1,448	1,970	203,483	379,655	+ 86.6	9.43	17.18	+ 82.2
Nova Scotia	51	67	7,024	12,859	+ 83.1	8.90	15.97	+ 79.4
New Brunswick	40	54	5,346	7,838	+ 46.6	8.42	12.02	+ 42.8
Quebec	202	275	22,342	53,502	+ 139.5	3.71	8.80	+ 137.2
Ontario	644	790	92,326	159,500	+ 72.8	11.99	20.09	+ 67.6
Manitoba	73	116	11,973	23,393	+ 95.4	12.12	23.44	+ 93.4
Saskatchewan	72	96	10,121	16,764	+ 65.6	10.93	18.46	+ 68.9
Alberta	123	213	18,864	40,182	+ 113.0	11.59	23.88	+ 106.0
British Columbia	224	327	31,853	58,457	+ 83.5	14.58	25.25	+ 73.2
Other Provinces	19	32	3,634	7,160	+ 97.0	5.29	10.03	+ 89.6

Source:
Statistics Canada, Market Research Handbook,
Catalogue No. 31-212.

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TABLE 23

Number and Sales of Vending Machine Operations,
1966-1973

Year	Number of Machines	Sales ((\$000's)	Index 1966=100
1966	84,154	107,540	100.0
1967	91,289	119,651	111.3
1968	95,867	127,059	118.2
1969	100,948	142,910	132.9
1970	103,751	156,822	145.9
1971	97,965	162,249	150.9
1972	105,588	178,909	166.4
1973	104,253	207,081	192.7

Source:
Statistics Canada, Market Research Handbook,
Catalogue No. 31-212.

TABLE 24

Sales by Vending Machine, by Products, 1966 and
1973

Product	1966 (\$000's)	1973 (\$000's)	Percentage Change 1973/1966	Percentage Distribution 1966	Percentage Distribution 1973
Total	107,540	207,081	+ 92.6	100.0	100.0
Tobacco	54,771	99,731	+ 82.1	50.9	48.2
Ice Cream	228	684	+ 200.0	0.2	0.3
Milk and Milk Products	2,745	6,524	+ 137.7	2.6	3.2
Cold Drinks					
--Vended in bottles, cans or cartons	5,978	13,406	+ 124.3	5.6	6.5
--Vended in disposable cups	11,236	17,839	+ 58.8	10.4	8.6
Hot drinks (coffee, tea, cup-vended soup)	15,942	32,030	+ 100.9	14.8	15.5
Bulk confectionery	1,255	2,545	+ 102.8	1.2	1.2
Packaged confectionery	4,423	10,193	+ 130.5	4.1	4.9
Pastries	4,549	6,250	+ 37.4	4.2	3.0
Canned hot foods & canned soup	1,335	3,385	+ 153.6	1.2	1.6
Other food	5,037	14,115	+ 180.2	4.7	6.8
Other non-food items	41	379	+ 824.4	---	0.2

Source:
Statistics Canada, Market Research Handbook,
Catalogue no. 31-212

PART II

FOOD PURCHASES



1. Family Food Expenditure Surveys

Although family food expenditure surveys have been conducted in Canada, they are not very useful for examining trends in family food expenditure or in quantities purchased over a period of time. Large surveys were conducted in 1949 and again in 1969, and smaller surveys in 1953, 1955, 1957, 1962 and 1974. Except for the 1974 survey, sample selection for the smaller surveys was limited as to family size and income requirements. The 1974 survey (1) differed from the 1969 survey (2) in that it was limited to 14 cities across Canada and that additional units were selected in the sampling procedure to provide more information on families and unattached individuals in the lower income ranges.

The 1969 survey provides detailed average food expenditures and quantities purchased for families and unattached individuals on a regional basis and according to urbanized size groupings. Both the 1969 and 1974 surveys provide information as to relationships between food expenditures and family attributes such as family composition and income. Data in both surveys were collected over a 12-month period and participants were asked to keep two-week diaries. At least one useable weekly diary was required from each participant for inclusion in the survey results. Income was calculated on the previous 12-month period and so reflected incomes for both the survey year and the previous year.

1.1. Comparison of Data from 1969 and 1974 Surveys

Direct comparisons of the data from the 1969 and 1974 surveys are difficult without going back to the original data. The reason for this is that very little of the data presented in the 1969 reports is presented in terms of the 14 cities used in the 1974 survey. Because of this Statistics Canada (3) has produced a package including the 1969 data and the 1974 data for the 14 major cities for comparison purposes. These data are presented as family income deciles and family types for all 14 cities. These data have been analyzed by Karamchandani (4) and will be discussed later. Information for the individual cities is not available from the statistical package.

Table VIII in Family Food Expenditure in Canada 1969 (1), Volume II presents expenditure data for the same 14 cities used in the 1974 survey. These data are presented for families of two or more persons. Therefore, the data presented here for the 1974 survey are for families of two or more persons. Other researchers such as Karamchandani (4), Spencer (5) and Hassan and Johnson (6) have used data for the total sample and so in some cases differ from the data used here.

Karamchandani (4) reports that per capita consumption of food as a whole was similar for 1974 and for 1969 and that increased expenditure resulted from an increase in food prices. This is supported by the Consumer Price Index for food which increased 48.3 per cent compared to the 48.4 per cent increase in total food expenditure. However, Canadians spent 69 per cent more for food away from home and only 42.6 per cent more for food at home. Some difference in data collection for

food away from home between the two surveys does exist which may be reflected in the increased expenditure for food away from home in the 1974 survey. Canadians spent a smaller proportion of their food dollars on meat and poultry (24.85 and 25.24 per cent), fruits and vegetables (11.65 and 12.78 per cent), dairy products (10.41 and 12.00 per cent), cereal and bakery products (18.38 and 9.33 per cent), and more on miscellaneous groceries (6.22 and 5.57 per cent) in 1974 than in 1969. (4)

On a regional basis the Prairie Region registered the lowest food expenditures per family and the Quebec Region the highest for the 1969 survey. On a city basis and considering data for families of two persons or more, Regina registered the lowest expenditure for food and Toronto the highest in 1969, whereas Saskatoon registered slightly lower than Regina in 1974 and Ottawa replaced Toronto as the highest (Table 25). The western cities of Calgary, Edmonton and Vancouver all registered considerably higher food expenditures per family in 1974 than in 1969. Regional differences are attributed to differences arising from family characteristics, purchasing habits, price levels and degree of urbanization of the region. The 1969 intercity price index indicated lower prices for Toronto than Regina; St. John's had by far the highest price index of all the 14 cities. The major difference in food expenditures is attributable to foods purchased away from home and to the purchase of meat products, particularly beef. This was true for both the 1969 and 1974 data.

Family size is a strong determinant of family food expenditure, the per family expenditure increasing with an increase in size of family. However, as family size increases the per person expenditure decreases. This was true for both the 1969 and 1974 data. Some of this decrease is attributable to less food being purchased away from home by large families. Examination of quantities purchased according to family size would give an indication as to possible nutritional effects from decreased per person expenditures for large families. For example Spencer (5) suggests that rather less milk is purchased for each additional child. Hassan and Johnson (6) reported a shift away from luxury-type foods as family size increases.

Family income is not as strong a determinant of family food expenditure as is family size. Increased income was reflected in more food purchased away from home, greater purchasing of prepared or partially prepared dishes and of frozen food. Hassan and Johnson (6) reported that demand for these products was more elastic with respect to income than for any other group of food products, (0.7870 for frozen orange juice to 0.3370 for snack foods.)

Examination of the data presented in Table 25 suggests support for trends apparent from disappearance data indicating declining consumption of dairy products, eggs, bakery and cereal products. However, statistics on quantities purchased should provide firmer data as to actual consumption differences between 1969 and 1974. Data presented in Table 25 also suggest a decrease in purchasing of canned, dried and

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TABLE 25

Distribution of Family Food Dollars, for Families of Two Persons or More, 1969^a and 1974^b Food Expenditure Surveys

City	Dairy Products			Eggs			Bakery & Cereal Products			Meat & Poultry		
	1969	1974		1969	1974		1969	1974		1969	1974	
	%	%		%	%		%	%		%	%	
St. John's	10.5	9.9	-	3.2	2.4	-	11.1	8.9	-	28.1	29.6	+
Halifax	14.9	12.9	-	2.7	2.0	-	9.8	8.5	-	25.3	24.9	-
Saint John	16.0	13.1	-	2.8	2.4	-	12.2	10.3	-	25.5	25.7	+
Quebec	13.2	11.6	-	2.2	1.5	-	10.7	9.5	-	32.8	26.3	-
Montreal	11.4	9.9	-	2.0	1.5	-	9.8	8.6	-	29.1	27.4	-
Ottawa	13.9	11.2	-	2.5	1.8	-	9.8	9.2	-	26.6	22.8	-
Toronto	12.6	10.9	-	2.5	2.0	-	9.7	8.8	-	24.0	24.3	+
Thunder Bay	14.6	12.9	-	3.0	2.1	-	10.2	8.6	-	27.2	28.4	+
Winnipeg	13.1	11.0	-	2.2	1.8	-	9.4	8.4	-	24.9	25.2	+
Regina	13.5	12.4	-	2.1	2.0	-	9.4	8.6	-	29.0	27.5	-
Saskatoon	13.4	12.5	-	2.5	1.8	-	9.1	8.6	-	28.8	22.5	-
Calgary	12.7	10.3	-	2.3	2.0	-	9.2	7.2	-	26.3	24.6	-
Edmonton	13.0	10.3	-	2.4	2.1	-	9.1	7.3	-	25.8	27.2	+
Vancouver	12.9	10.2	-	2.6	2.0	-	9.8	8.4	-	24.3	24.6	+

City	Fish			Fats & Oils			Fruits & Vegetables			Frozen Foods		
	1969	1974		1969	1974		1969	1974		1969	1974	
	%	%		%	%		%	%		%	%	
St. John's	1.8	2.7	+	2.5	2.7	+	15.9	12.3	-	1.5	2.0	+
Halifax	2.4	2.9	+	2.0	2.1	+	12.9	11.4	-	1.6	2.0	+
Saint John	2.6	2.4	-	1.8	2.4	+	12.0	11.6	-	1.6	2.2	+
Quebec	1.2	1.6	+	1.0	1.9	+	12.4	12.4		.5	1.2	+
Montreal	1.6	2.0	+	1.2	2.0	+	12.6	12.6		.9	1.2	+
Ottawa	1.5	1.5	-	1.4	2.5	+	12.8	10.8	-	1.6	2.6	+
Toronto	2.0	1.9	-	1.3	2.2	+	12.9	11.9	-	1.7	1.9	+
Thunder Bay	1.5	1.5		1.9	2.2	+	13.6	12.5	-	1.3	1.5	+
Winnipeg	1.6	1.7	+	1.3	2.0	+	12.3	11.8	-	1.6	1.5	-
Regina	1.4	1.7	+	1.5	2.3	+	13.2	12.9	-	1.6	1.7	+
Saskatoon	1.6	1.8	+	2.3	2.6	+	13.7	12.9	-	1.0	1.6	+
Calgary	1.5	1.3	-	1.7	2.1	+	12.6	10.8	-	1.5	1.7	+
Edmonton	2.0	1.5	-	1.6	2.1	+	13.5	11.0	-	1.8	1.8	
Vancouver	2.0	2.2	+	1.9	2.3	+	13.1	10.3	-	1.7	1.7	+

PART II

TABLE 25 (cont'd)

City	Other			Food Away From Home			Total Food Expenditure		
	1969	1974		1969	1974		1969	1974	
	%	%		%	%		%	%	
St. John's	14.6	15.7	+	10.9	14.5	+	34.69	44.66	+
Halifax	13.7	13.1	-	14.8	20.1	+	29.53	40.51	+
Saint John	14.2	13.9	-	11.4	15.7	+	29.22	43.09	+
Quebec	12.4	13.8	+	13.5	19.7	+	33.67	44.50	+
Montreal	11.9	12.1	+	19.5	21.9	+	34.55	45.67	+
Ottawa	11.5	13.9	+	18.2	23.8	+	33.81	48.51	+
Toronto	11.4	11.8	+	21.9	24.1	+	34.91	46.28	+
Thunder Bay	13.1	13.9	+	13.6	16.0	+	32.83	44.08	+
Winnipeg	12.9	13.2	+	20.7	23.2	+	30.25	42.35	+
Regina	13.4	12.8	-	15.0	18.0	+	27.45	38.17	+
Saskatoon	13.0	13.6	+	14.7	21.8	+	30.73	35.92	+
Calgary	12.6	13.4	+	19.6	25.9	+	32.67	45.92	+
Edmonton	12.2	12.2		18.5	23.6	+	33.80	48.33	+
Vancouver	12.9	11.2	-	18.9	27.0	+	30.76	48.42	+

a From Table VIII in Family Food Expenditure in Canada, Volume II, Statistics Canada 1969

b Calculated from data presented in Tables 4a, 4b, 4c, Urban Family Food Expenditure 1974 Statistics Canada. Selected tables Revised Jan. 1976

fresh fruits and vegetables. Because frozen fruit and vegetable purchases are reported in the frozen food group this may not be an accurate picture for fruits and vegetables. Differences in dollars spent on fats and oils between 1969 and 1974 suggest support for the disappearance data for increased consumption of these commodities. Also a greater proportion of food dollars was spent on frozen foods and food away from home in 1974 than in 1969. Some of the increased purchase of frozen foods undoubtedly reflects increased use of frozen vegetables and to a lesser extent frozen fruit. Data for individual items would need to be examined to determine the magnitude of the increase. The comparison of purchasing patterns between 1969 and 1974 for various items within the product groups would require access to the original data. For example, it would be of interest to know how much of the decrease in expenditure for dairy products is a result of a decrease in the purchase of butter (an 11 per cent drop in expenditure for butter) (4), and how much of the increase in the expenditure for fats and oils is a result of an increase in the purchase of margarine (127 per cent of reported) (4). It would also be of interest to know the purchasing patterns for fluid skim, 2-per cent, 1-per cent and whole milk and dried skim milk. Disappearance data indicate an increase in consumption of cheese and ice cream, which are included in the dairy category. Karamchandani (4) reported an increase in the purchase of cheese but a decrease in the purchase of ice cream between 1969 and 1974. Considering the decrease in expenditure for the dairy group and the fact that many cheeses and ice cream have higher caloric values and lower protein values than milk, there could be long-term nutrition implications. Consumption of milk, dairy products and margarine based on the 1969 data have been discussed in detail by McCormick (7).

Karamchandani (4) reported that per capita purchases of eggs decreased 5.1 per cent, bread 16.6 per cent, cookies 28.6 per cent, and unprepared breakfast cereals 13.5 per cent between 1969 and 1974. An increase in the purchase of margarine, salad dressing, corn oil and peanut oil and a decrease in the purchase of shortening and lard was noted. Per capita purchase of sugar increased 1.3 per cent between 1969 and 1974. Per capita purchase of most fruits and vegetables declined, except for purchases of tomatoes, lettuce, onions and cucumbers.

2. Nutritional Implications

From the standpoint of nutritional adequacy, the quantity data obtained in the 1969 and 1974 surveys are of more interest than the dollar expenditure. This is especially so when one considers that the amount spent per person decreases with an increase in family size. Also, quantities purchased of foods high in calories but low in other nutrients would be of interest in determining food purchasing patterns which might favour the development of obesity in segments of the population. The effects of the continued consumption of small excesses of calories are discussed under trends in nutrient intake.

The nutritional adequacy of quantities purchased for segments of the population, such as persons 65 and over or single adults with children,

as well as for specific regions of the country, would be useful in determining the needs of these groups.

A great deal of food purchase data is available from both the 1969 and 1974 surveys and would be a useful adjunct to the 1970-72 Nutrition Canada food consumption data.

3. Economic and other Considerations

Hassan and Johnson (6) analyzed the 1974 survey data in an attempt to determine how families respond to changes in income, family size and price. They observed that the proportions of food dollars spent on eggs, fish beverages, groceries, fruits and vegetables declined as income increased. Calculated expenditure elasticities of demand for food prepared at home, total food and food away from home indicated that a 10 per cent increase in income increased expenditure on food at home, total food and food away from home by 0.92, 2.4 and 8.3 per cent respectively. Examination of the data presented in Table 25 would suggest that at least part of the increase in total food expenditures for 1974 over that for 1969 is a result of an increase in the expenditure for food away from home and could reflect increased income levels for Canadians.

Spencer (5) analyzed the 1974 survey data for determinants of demand for a wide range of commodities. He observed that the quantity of each of the food items purchased varied directly with level of income. This was true for two-thirds of the commodities considered and was less true for such foods as fluid milk, powdered skim milk, bread, minced beef, margarine, canned baked beans, potatoes and frozen peas. The opposite was true for prepared and partially prepared dinners which showed an inverse relationship with level of income. Although income level was less important than family size in determining family food expenditure it did affect the type of food bought within a food group. For example Spencer observed that purchases of low fat milk increased as level of income increased but that level of income had no effect on the purchase of skim milk powder. Hassan and Johnson (6) determined that demand for milk was inelastic and was probably more responsive to age distribution of the population than to income changes. The purchase of beef loin cuts was directly related to income and to a lesser degree to family size. Spencer notes that families with three or more children consumed more minced beef than did smaller families (5). This was supported by Hassan and Johnson (6) who determined that demand for high quality meat cuts was more income-elastic than demands for all cuts of the carcass. The demand for lamb and veal was also highly income-elastic.

Hassan and Johnson found that expenditure elasticities for bread and cereal products exhibited negative directions and interpreted these to a possible reflection of substitutions away from starch foods as income rises. Purchases of corn oil and salad dressings increased somewhat with increased income whereas purchases of margarine, vegetable shortening and lard decreased somewhat as income increased. Effect of income was negligible for tea and coffee but significant for soft drinks and total beverages. Demand for canned vegetables was affected by income

more than that for fresh vegetables but canned and fresh fruit exhibited almost identical demand. Frozen foods and prepared dishes were more income-elastic than any other group of food products.

Hassan and Johnson (6) determined price-elasticity demands and observed that high quality meat cuts were more price-elastic than low quality meat cuts. Demand for cod and salmon was found to be highly price-elastic whereas halibut, canned salmon and canned tuna were less so. With the exception of instant mashed potatoes the demand for frozen and prepared dishes was less price-elastic than other food commodity groups.

Spencer (5) noted differences in purchase of food items according to the ethnic background of families. Families other than English speaking tended to purchase more butter, eggs, bread, loin beef, chicken, margarine, apples, potatoes and less frozen orange juice and frozen peas. Ukrainian, Italian and Polish ethnic groups tended to purchase less potatoes and prepared dinners. German and Dutch speaking families purchased less bacon, whereas English and French speaking families purchased less pork. Those families other than English and French speaking purchased more sugar, oranges and tomatoes, and less canned soup and canned peaches. English speaking families purchased more canned salmon and French speaking families purchased more canned peas.

Regional differences in food items purchased were noted by Spencer (5). He observed that milk consumption varied among cities, the biggest difference being between St. John's, Newfoundland and Toronto. Families living in St. John's averaged 4.65 quarts per week less than families living in Toronto. Families living in Toronto tended to purchase less minced beef than families in other cities, particularly Montreal, Thunder Bay, Winnipeg, Edmonton and Vancouver. However this greater use of minced beef was not reflected in a lower proportion of the food dollars being spent on meat and poultry products. Families living in Saint John, New Brunswick and Calgary purchased less chicken and those living in Montreal purchased more than families living in Toronto. Canned salmon purchases were lower in St. John's and Vancouver relative to Toronto and higher in Winnipeg and Regina. Margarine purchases were higher for families living in Saint John and Quebec relative to Toronto and very low in St. John's. Families living in Saint John, Calgary, Edmonton and Vancouver purchased more sugar than those living in Toronto. Families in the Atlantic region purchased more canned peas and those living in cities west of Toronto purchased less than Toronto families. Fewer oranges were purchased by families living in Quebec, Thunder Bay and the Prairie region.

Families in which the head was 65 years of age or over exhibited different purchasing patterns. These families tended to purchase more bacon, bread, sugar, canned peaches and canned pears, oranges and tomatoes (5).

Families in which the head was classified as managerial/technical also exhibited different purchasing patterns. These families purchased less butter, bread, bacon, sugar, canned soup, canned peas, potatoes and

tomatoes. These families purchased considerably more frozen orange juice and frozen peas.

It is likely that income is a factor in determining purchasing patterns for these groups and should be considered when examining purchase patterns for regional areas, ethnic groups, etc. For those families in which the head is 65 or over, purchase patterns probably reflect long established food habits in addition to income. Purchasing patterns for families in which the head is classified managerial/technical may reflect a greater concern for health.

Clearly it is necessary to go beyond proportion of food dollars spent and examine the quantities purchased of the food items within the commodity groups to fully understand the consumption implications of these data. As incomes increase and technology provides more frozen and prepared foods, more attention should be given to these types of food items. To date, statistical analysis has tended to concentrate on the traditional commodities such as dairy products, meats, etc.

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- (6) S.A. Hassan and S.R. Johnson, "Urban Food Consumption Patterns in Canada". An Empirical Analysis. Economics Branch, Agriculture Canada, January 1977.
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TRENDS IN NUTRIENT INTAKE



1. Dietary Surveys

A series of reports on the Nutrition Canada survey (footnotes 1-4) has provided information on nutrient intakes, nutritional status and food patterns of Canadians in 1970-72. The dietary data of the survey reports are based on recalls of food intake of the previous 24 hours from a population sample of more than 15,000 persons. Because an individual's food intake varies somewhat from day to day, a recall of only one day's consumption may not be a very reliable estimate of average intake. For groups of persons, however, the variations of individuals tend to be minimized and 24-hour recalls have been shown to provide estimates of dietary intakes similar to seven-day food records (5). Because dietary intakes often present a skewed distribution, the median rather than the mean is considered the more appropriate estimate of group intake (6).

Some individual dietary surveys of local population groups in Canada have been carried out in recent years (7-15). In most cases these studies used food records covering three to seven days and they provide information about specific local groups.

In the 1940's interest in nutrition was high and several dietary studies were carried out in Canada. Before the advent of electronic calculators and computers, totalling nutrient intakes was a time-consuming process. As a result many of the earlier studies evaluated dietary adequacy not on the basis of nutrient intake but on numbers of servings of food groups. However a few studies from the 1940's provide some information on individual nutrient intakes (16-21). These have been examined in relation to dietary studies and nutrition surveys of recent years.

Dietary survey data provide information about nutrient intakes which are frequently compared with standards such as the Canadian Dietary Standard (22). Table 26 presents a summary of nutrient intakes recommended in the Canadian Dietary Standard, 1975 revision.

The nutrient intakes recommended in the Canadian Dietary Standard are considered adequate to meet the needs of practically all healthy persons in the population. Thus, recommendations for protein, minerals and vitamins exceed minimum requirements for many individuals. Recommendations of the Canadian Dietary Standard for energy are based upon average intakes to meet the needs of typical persons in each age/sex group. For the Nutrition Canada Survey (1,3), an interpretive standard was developed based on classification of nutrient intake at three levels: inadequate intakes, those below minimum requirements; less-than-adequate or marginal intakes, those above minimum requirements but below adequate intakes; and adequate intakes, those providing a reasonable measure of safety in meeting the requirements for a nutrient.

TABLE 26

Recommended Daily Nutrient Intake--Revised 1975

Age	Sex	Weight (kg)	Height (cm)	Energy ^a (kcal) (MJ) ^b		Protein (g)	Water-Soluble Vitamins			
							Thiamin (mg)	Niacin (NE) ^f	Riboflavin (mg)	Vitamin B6 ^g (mg)
0-6 mo	both	6	-	kgx117	kgx0.49	kgx2.2(2.0) ^e	0.3	5	0.4	0.3
7-11 mo	both	9	-	kgx108	kgx0.45	kgx1.4	0.5	6	0.6	0.4
1-3 yrs	both	13	90	1400	5.9	22	0.7	9	0.8	0.8
4-6 yrs	both	19	110	1800	7.5	27	0.9	12	1.1	1.3
7-9 yrs	M	27	129	2200	9.2	33	1.1	14	1.3	1.6
	F	27	128	2000	8.4	33	1.0	13	1.2	1.4
10-12 yrs	M	36	144	2500	10.5	41	1.2	17	1.5	1.8
	F	38	145	2300	9.6	40	1.1	15	1.4	1.5
13-15 yrs	M	51	162	2800	11.7	52	1.4	19	1.7	2.0
	F	49	159	2200	9.2	43	1.1	15	1.4	1.5
16-18 yrs	M	64	172	3200	13.4	54	1.6	21	2.0	2.0
	F	54	161	2100	8.8	43	1.1	14	1.3	1.5
19-35 yrs	M	70	176	3000	12.6	56	1.5	20	1.8	2.0
	F	56	161	2100	8.8	41	1.1	14	1.3	1.5
36-50 yrs	M	70	176	2700	11.3	56	1.4	18	1.7	2.0
	F	56	161	1900	7.9	41	1.0	13	1.2	1.5
51+ yrs	M	70	176	2300 ^c	9.6 ^c	56	1.4	18	1.7	2.0
	F	56	161	1800 ^c	7.5 ^c	41	1.0	13	1.2	1.5
Pregnancy				+300 ^d	1.3 ^d	+20	+0.2	+2	+0.3	+0.5
Lactation				+500	2.1	+24	+0.4	+7	+0.6	+0.6

a Recommendations assume characteristic activity pattern for each age group.

b Megajoules (10⁶ joules). Calculated from the relation 1 kilocalorie = 4.184 kilojoules and rounded to 1 decimal place.

c Recommended energy intake for age 66+ years reduced to 2000 kcal (8.4 MJ) for men and 1500 kcal (6.3 MJ) for women.

d Increased energy intake recommended during 2nd and 3rd trimesters. An increase of 100 kcal (418.4 kJ) per day is recommended during the 1st trimester.

e Recommended protein intake of 2.2 g/kg body wt. for infants age 0-2 mo and 2.0 g/kg body wt. for those age 3-5 mo. Protein recommendation for infants 0-11 mo assumes consumption of breast-milk or protein of equivalent quality.

f 1NE (niacin equivalent) is equal to 1 mg of niacin or 60 mg of tryptophan.

g Recommendations are based on estimated average daily protein intake of Canadians.

TABLE 26, cont'd.

Age	Sex	Water-Soluble Vitamins			Fat-Soluble Vitamins		
		Folate ^h (μ g)	Vitamin B12 (μ g)	Vitamin C (mg)	Vitamin A (μ g cholecalciferol) ^j	Vitamin D (μ g cholecalciferol) ^k	Vitamin E (mg d- α -tocopherol)
0-6 mo	both	40	0.3	20 ^l	400	10	3
7-11 mo	both	60	0.3	20	400	10	3
1-3 yrs	both	100	0.9	20	400	10	4
4-6 yrs	both	100	1.5	20	500	5	5
7-9 yrs	M	100	1.5	30	700	2.5 ^l	6
	F	100	1.5	30	700	2.5 ^l	6
10-12 yrs	M	100	3.0	30	800	2.5 ^l	7
	F	100	3.0	30	800	2.5 ^l	7
13-15 yrs	M	200	3.0	30	1000	2.5 ^l	9
	F	200	3.0	30	800	2.5 ^l	7
16-18 yrs	M	200	3.0	30	1000	2.5 ^l	10
	F	200	3.0	30	800	2.5 ^l	6
19-35 yrs	M	200	3.0	30	1000	2.5 ^l	9
	F	200	3.0	30	800	2.5 ^l	6
36-50 yrs	M	200	3.0	30	1000	2.5 ^l	8
	F	200	3.0	30	800	2.5 ^l	6
51+ yrs	M	200	3.0	30	1000	2.5 ^l	8
	F	200	3.0	30	800	2.5 ^l	6
Pregnancy		+50	+1.0	+20	+100	+2.5 ^l	+1
Lactation		+50	+0.5	+30	+400	+2.5 ^l	+2

^h Recommendation given in terms of free folate.

ⁱ Considerably higher levels may be prudent for infants during the first week of life to guard against neonatal tyrosinemia.

^j 1RE (retinol equivalent) corresponds to a biological activity in humans equal to 1 μ g retinol (3.33 IU) or 6 μ g β -carotene (10 IU).

^k One μ g cholecalciferol is equivalent to 1 μ g ergocalciferol (40 IU vitamin D activity).

^l Most older children and adults receive vitamin D from irradiation but 2.5 μ g daily is recommended. This intake should be increased to 5.0 μ g daily during pregnancy and lactation and for those confined indoors or otherwise deprived of sunlight for extended periods.

TABLE 26, cont'd.

Age	Sex	Minerals					
		Calcium (mg)	Phosphorus (mg)	Magnesium (mg)	Iodine (µg)	Iron (mg)	Zinc (mg)
0-6 mo	both	500 ^m	250 ^m	50 ^m	35 ^m	7 ^m	4 ^m
7-11 mo	both	500	400	50	50	7	5
1-3 yrs	both	500	500	75	70	8	5
4-6 yrs	both	500	500	100	90	9	6
7-9 yrs	M	700	700	150	110	10	7
	F	700	700	150	100	10	7
10-12 yrs	M	900	900	175	130	11	8
	F	1000	1000	200	120	11	9
13-15 yrs	M	1200	1200	250	140	13	10
	F	800	800	250	110	14	10
16-18 yrs	M	1000	1000	300	160	14	12
	F	700	700	250	110	14	11
19-35 yrs	M	800	800	300	150	10	10
	F	700	700	250	110	14	9
36-50 yrs	M	800	800	300	140	10	10
	F	700	700	250	100	14	9
51+ yrs	M	800	800	300	140	10	10
	F	700	700	250	100	9	9
Pregnancy		+500	+500	+25	+15	+1 ⁿ	+3
Lactation		+500	+500	+75	+25	+1 ⁿ	+7

m The intake of breast-fed infants may be less than the recommendation but is considered to be adequate.

n A recommended total intake of 15 mg daily during pregnancy and lactation assumes the presence of adequate stores of iron. If stores are suspected of being inadequate, additional iron as a supplement is recommended.

Source: Dietary Standard for Canada, Health Protection Branch, Health and Welfare Canada, 1975.

2. Energy

2.1. Energy Intakes - Nutrition Canada Survey

Median energy intakes for different age groups of national and provincial samples (3) in the Nutrition Canada survey are shown in Table 27. Provincial differences were few. Median intakes of calories for almost all age groups in Newfoundland and Prince Edward Island were above the national median while those of elderly women in three provinces, Nova Scotia, Manitoba and British Columbia, were below the national median.

Calorie intakes did not appear excessive and yet large numbers of adults were classified as overweight. Information is not yet available from the Nutrition Canada survey on the prevalence of overweight among children and adolescents. Presumably this will be published in forthcoming reports.

Classification of adults as overweight was based on ponderal index* values below 12.5. Prevalence of overweight among adults was around 40 per cent for young adult men and women, over 60 per cent for adults in middle years, 65 per cent for elderly men and almost 80 per cent for elderly women (22).

Some provincial differences were found in the prevalence of overweight but these did not appear related to provincial differences in calorie intakes (3). For example, prevalence of overweight among young adult men and among elderly men and women in Prince Edward Island and among men of all ages in New Brunswick was less than in other provinces although median calorie intakes for these groups, were in many cases, higher than for comparable groups in other provinces. In Manitoba the prevalence of overweight among elderly men, elderly women and young adult men was higher than in other provinces. Median calorie intakes of elderly men and women in Manitoba were lower than those in any other province and those of young adult men in Manitoba were lower than all other provinces except British Columbia.

A relationship between income and overweight was found only among middle-aged adults, and the relationship was in opposite directions for men and women. Overweight was more prevalent among lower income middle-aged women than it was among higher income women of the same age. However, for middle-aged men prevalence of overweight was lowest among those in lowest income category (2).

The Nutrition Canada report concluded that the prevalence of overweight could not be attributed to great excesses in calorie intake since there was little difference between the median calorie intakes of those overweight and those not overweight. In fact, for each age/sex group,

* $\text{Ponderal index} = \frac{\text{height in inches}}{\text{cube root of weight in pounds}}$

TABLE 27

Median Energy Intakes (Calories per day) for
Different Age/Sex Groups in Nutrition Canada
National and Provincial Samples^a

	Children		Males				Females			
	1-4 ^b yr	5-9 yr	10-19 yr	20-39 yr	40-64 yr	65+ yr	10-19 yr	20-39 yr	40-64 yr	65+ yr
National	1521	2090	2952	3188	2465	1902	2127	1933	1653	1479
Newfoundland	--	2512	3728	3181	2989	2512	2660	2593	1831	1881
Prince Edward Island	--	2355	3066	3364	3025	1936	2427	1866	1826	1913
Nova Scotia	--	2332	2897	3122	2870	2045	2415	1644	1653	1288
New Brunswick	--	2167	2875	3537	2654	1842	2412	1986	1745	1476
Quebec	--	2224	2873	3215	2578	2182	2270	2154	1695	1541
Ontario	--	2037	3037	3191	2296	1762	2019	1914	1711	1479
Manitoba	--	2194	3041	2899	2507	1766	2011	2074	1555	1125
Saskatchewan	--	2137	2753	3089	2648	1977	2025	2066	1562	1497
Alberta	--	1927	2723	3168	2339	1964	1875	1785	1601	1440
British Columbia	--	2098	2934	2858	2425	1888	2091	1661	1602	1248

^a Health and Welfare Canada, Nutrition Canada
Provincial Reports, 1975.

^b In this and subsequent tables of median nutrient intakes, values for young children in an age group 1-4 years are available only for the national sample. Analysis of provincial samples was limited to one classification of ages 0-4 year inclusive. These data are not presented since feeding patterns of infants 0-1 years of age differ in many ways from those of children 1-4 years.

median calorie intake of the overweight was somewhat less than that of the non-overweight (1).

It seems more likely that a low level of energy expenditure as a result of sedentary life style, rather than high level of energy intake, is responsible for much of the overweight among Canadians. Another factor could be the cumulative effect of small excesses of calorie intakes. For example, excess intake over expenditure of only 120 calories per day (equivalent to the calories in one 6-ounce can of soft drink) would, over a period of five years, result in a total excess of 219,000 calories, sufficient to increase body weight by 60 pounds.

Although overweight was found to be a major nutritional problem in Canada, the relatively low calorie intake of some adult and adolescent females was a cause for concern. Median energy intakes of women averaged around 1700 calories. Median energy intakes of 18-year-old females were less than 30 calories per kilogram body weight (3). This is about three fourths of the energy intake assigned to this age group by the Canadian Dietary Standard (22), as shown in Table 26. With low calorie intakes, very careful planning is required to ensure adequate intakes of protein, minerals and vitamins. It is difficult to achieve adequate diets under conditions of limited food intake.

2.2 Changes in Energy Intake of Canadians since 1940

In recent decades there have been significant changes in the life style of Canadians, with increased mechanization in the work place and the home. Presumably carrying out our daily tasks now requires less energy than in years past. With this in mind it is interesting to compare energy intakes of Canadians in the 1970's with those three decades earlier. In Table 28 are shown average energy intakes of children, adolescents and adults calculated from some local dietary surveys of the 1940's (16-19) and the 1970's (7-14), and median and mean values for energy intakes of corresponding age groups from the Nutrition Canada Survey Reports (3,4). Because of differences in sampling procedures and dietary study methods, comparisons in calorie intake between the 1940 and 1970 small group studies, and between the small group studies and the Nutrition Canada survey should not be regarded as precise estimates, but rather as possible indicators of a trend towards greater or less energy intake. Viewed in this same way, energy intakes of children and adult males would appear to be somewhat greater now than in the 1940' and energy intakes of adolescent females to be slightly less than those of adolescent females in the 1940's. Energy intakes of adolescent males and adult females in the 1970-72 period appear similar to those in 1940-45.

2.3 Changes in Recent Decades in Prevalence of Overweight among Canadian Adults

Writing on the state of Canadian nutriture in 1953, Young (23) concluded that one-fifth of the Canadian adult population was overweight, judged on the basis of 10 per cent or more above ideal weight.

TABLE 28

Comparison of Mean Caloric Intakes of Canadians
Calculated from Reports of Dietary Studies
1941-45 with Those from Dietary Studies 1968-77
and from Nutrition Canada Survey 1970-72

Local Dietary Studies 1941-45 ^a		Dietary Studies 1968-77 ^b	
Age Group ^d	Calories per day ^{e,f} Mean	Age Group ^d	Calories per day ^{e,g} Mean
CHILDREN			
1-3 yr (85)	1080	2-3 yr (105)	1610
4-12 yr (329)	1710	4-12 yr (1185)	2120
ADOLESCENTS			
Males 13-18 yr (337)	2950	Females 15 yr (512)	2130
Females 13-18 yr (401)	2410		
ADULTS			
Males (367)	2520	Males students (49)	2850
Females (392)	1930	Females students (158)	2090

Nutrition Canada 1970-72 ^c		
Age group ^d	Calories per day ^{e,h}	
	Median	Mean
CHILDREN		
0-4 yr (1274)	1410	-
1-4 yr (1031)	-	1670
5-9 yr (1351)	2090	
5-11 yr (1995)	-	2300
ADOLESCENTS		
Males 10-19 yr (1410)	2950	-
12-19 yr (1070)	-	3250
Females 10-19 yr (1472)	2130	-
12-19 yr (1162)	-	2240
ADULTS		
Males 20-39 yr (997)	3190	3370
40-64 yr (1223)	2460	2670
Females 20-39 yr (1340)	1930	2000
40-64 yr (1504)	1650	1730

a Weighted means, calculated from data in references 44-47

b Weighted means, based on data in reference 35-42

c From Health and Welfare Canada Nutrition Canada Provincial Reports, 1975 and Nutrition Canada Food Consumption Patterns Report, 1976

d Numbers in brackets are numbers of persons entering each average

e Calorie values rounded to nearest tens digit

f Based on seven-day food records

g Based on food records of three to seven days

h Dietary information from 24-hour recall.

The Nutrition Canada estimates, based on ponderal index values, indicated in the early 1970's almost half of the adult population was overweight (1). Even given the fact that the two criteria, ponderal index and per cent above ideal weight, would be expected to give different estimates of overweight, the conclusion seems inescapable that overweight is now more prevalent among adult Canadians than it was two or three decades ago.

2.4 Food Sources of Energy in Canadian Diets

Relative importance of different food groups as sources of energy in Canadian diets are shown in Table 29 as determined in the Nutrition Canada survey (4) and in Table 30 as determined in small sample studies of specific groups, 1970-77 (8-15).

Taking the population as a whole, cereal products supply from one-quarter to one-third of energy value of the diet. The somewhat lower estimates of per cent contribution of cereals to energy for each age group in the Nutrition Canada data may be due to the inclusion of some cereal products in mixed dishes under the food group category of "other". For most age groups, cereal products were the primary energy source.

For children under twelve, dairy products were secondary and, at earlier ages, primary sources of energy. For adults the food group comprised of meat, fish, poultry and eggs was the second and, in the case of young adult men, the primary source of energy. Contribution of dairy products to energy intakes was 11 to 12 per cent for adult age groups except elderly women where it was 15 per cent.

Average intake of calories per day from sugar, soft drinks, beer and wine for different age groups as reported for the Nutrition Canada survey (4) is shown in Table 31. It should be emphasized that these foods contribute only energy (calories) to the diet. Since the survey clinics did not cover weekends, these estimates, especially of intake of soft drinks, beer, and wine, must be regarded as conservative. In considering reasons for overweight among Canadians, level of consumption of these "empty calorie" foods should not be over-looked.

3. Protein

3.1. Protein Intakes: Nutrition Canada Survey

Median intakes of protein for the different age groups and in the various regions of the Nutrition Canada survey (3) are shown in Table 32. Protein intakes were more than adequate for children, adolescents and young and middle-aged adults. Protein intakes of elderly men and women were generally adequate but close to marginal levels.

PART III

TABLE 29

Per Cent Contribution of Food Groups to Energy Intakes (Nutrition Canada Survey^a)

	Dairy Products	Meat, Poultry Fish, Eggs	Cereal Products	Fruits and Fruits Products	Vegetables & Potatoes	Fats & Oils	Other ^b
Children:							
1-4 years	28	14	24	9	8	5	12
5-11 years	19	14	29	8	8	6	15
Adolescents:							
12-19 years, males	16	18	29	4	9	7	16
12-19 years, females	16	17	29	6	9	7	17
Adults:							
20-39 years, males	11	26	23	4	9	7	20
20-39 years, females	12	23	26	6	9	7	16
40-64 years, males	11	23	26	4	7	8	20
40-64 years, females	11	23	27	7	8	8	15
65+ years, males	12	22	29	5	7	8	16
65+ years, females	15	18	31	8	7	7	13

b Includes legumes and mixed dishes.

Source:
Health and Welfare Canada, Nutrition Canada Food Consumption Patterns Report, 1976.

TABLE 30

Per Cent Contribution of Food Groups to Energy Intake of Specific Population Groups

Age Group ^a	Dairy Products	Meat, Poultry, Fish, Eggs, Legumes	Cereal Products	Fruits & Fruit Products	Vegetables & Potatoes	Fats & Oils	Other
Children:							
3-5 yrs lower income (32) ^b	23	15	35	6	10	-	11
3-5 yrs higher income (42) ^b	23	18	31	13	6	-	9
2-5 yrs (49) ^c	35	17	27	9	7	5	-
8-12 yrs (99) ^d	20	20	34	6	7	4	8
University students ^e :							
Males (49)	16-22	19-28	25-28	6-7	6-8	-	18
Females (51)	15-22	18-21	28-30	10	5-8	-	15-17
Elderly men and women: (50) ^f	15	17	40	9	6	6	7

a Numbers in brackets are number of persons studied.

b From reference 8.

c From reference 12.

d From reference 14.

e From reference 15.

f From reference 11.

PART III

TABLE 31

Mean Intake per Day of Calories from Sugar, Soft Drinks, Beer and Wine for Age/Sex Groups in Nutrition Canada Sample from the General Population.

	Mean Consumption per Day				Mean Intake Calories ^a per Day from		
	Sugar tsp.	Soft Drink oz.	Beer oz.	Wine oz.	Sugar and soft drinks	Beer and wine	Total
Children:							
1-4 years	5	1½	-	-	105	-	105
5-11 years	7	3	-	-	170	-	170
Adolescents:							
12-19 yrs males	10	6½	½	-	290	6	296
12-19 yrs females	7	4½	-	-	200	-	200
Adults:							
20-39 yrs males	10	6½	12½	¾	290	170	460
20-39 yrs females	6	4	1½	½	175	20	195
40-64 yrs males	9	2½	7½	7½	190	125	315
40-64 yrs females	5	1½	1	½	110	20	130
65+ yrs males	8	1½	2	½	145	30	175
65+ yrs females	5	½	½	½	85	10	95

a Calculated on basis of 15 calories per teaspoon sugar; 22 calories per oz. soft drink; 12 calories per oz. beer; 30 calories per oz. wine

Source:
Health and Welfare Canada, Nutrition Canada Food Consumption Patterns Report and Supplementary Tables, 1976.

TABLE 32

Median Intakes of Protein (g per day) for Different Age/Sex Groups in Nutrition Canada National and Provincial Samples

	Children		Males				Females			
	1-4 ^b yr	5-9 yr	10-19 yr	20-39 yr	40-64 yr	65+ yr	10-19 yr	20-29 yr	40-64 yr	65+ yr
National	54	69	96	110	85	67	73	67	60	49
Newfoundland	--	70	150	118	99	86	104	93	68	60
Prince Edward Island	--	73	90	108	99	64	83	59	69	57
Nova Scotia	--	76	102	105	96	72	74	59	53	45
New Brunswick	--	70	94	124	87	67	80	69	59	45
Quebec	--	70	81	105	86	69	70	67	56	52
Ontario	--	70	108	116	85	57	76	66	62	51
Manitoba	--	65	110	102	96	65	70	67	53	44
Saskatchewan	--	70	96	113	87	64	66	78	55	45
Alberta	--	66	95	129	76	67	63	72	59	51
British Columbia	--	71	97	110	80	68	76	58	62	47

b See footnote b, Table 27

Source:
Health and Welfare Canada, Nutrition Canada Provincial Reports, 1975

Differences among regions in median protein intakes were slight, with the exception of adolescents in Newfoundland who had higher protein intakes than adolescents in other areas.

Although protein intakes were generally above recommended levels, they are nonetheless compatible with health. Foods supplying protein to the diet are good dietary sources of minerals such as iron and zinc. Marginal and poor levels of protein consumed by some elderly adults are probably more a reflection of quantity rather than quality of food intake.

3.2. Protein Content of Diets

In the Nutrition Canada survey the average per cent of dietary calories from protein was 14 per cent for young, middle-aged and elderly adults, and 13 to 15 per cent for children and adolescents (Table 33) (4). These values are similar to the 14 to 16 per cent of calories from protein reported from other recent studies of various age groups in North America (24) and for adults in Toronto and Halifax in 1941 (16,17) and farm families in Quebec in 1945 (21)(Table 34).

The constancy of the proportion of dietary calories supplied by protein in diets of persons of different age groups and from different Canadian studies is remarkable. It suggests, as far as protein is concerned, a level of dietary preference which is fairly uniformly distributed.

3.3. Dietary Sources of Protein

Per cent of dietary protein contributed by different food groups for various age groups in the Nutrition Canada survey (4) is shown in Table 35. Dairy products were a primary source of protein for young children and secondary sources for older children and adolescents. Primary source of protein for adolescents and adults was the food group comprised of meat, fish, poultry and eggs, which contributed from two-fifths to one-half of the dietary protein for these groups. The food groups consisting of cereal products and dairy products each contributed one-fifth to one-seventh of dietary protein for adults.

4. Fat

Nutritionally, an important aspect with respect to dietary intakes of fat is the proportion of total energy provided by fat. The Food Consumption Patterns Report of the Nutrition Canada survey has indicated that on average, 40 per cent of calories were provided by fat in diets of all age groups except children up to eleven years (38 per cent dietary calories from fat) and adults over 65 years (39 per cent dietary calories from fat) (Table 33). At all age levels the proportion of calories from fat is higher than the 30 to 35 per cent calories as fat recommended recently in the Report of the Committee on Diet and Cardiovascular Disease (25).

As with protein, the constancy of proportions of energy from fat intake of different age groups in the population is remarkable. It was

TABLE 33

Per Cent Contribution of Protein and Fat to Total Calories for Different Age/Sex Groups in Nutrition Canada National Sample from the General Population

Age/Sex Group	Percent Calories from	
	Protein	Fat
Children:		
1-4 years	15	38
5-11 years	13	38
Adolescents:		
12-19 years, males	14	40
12-19 years, females	14	40
Adults:		
20-64 years, males	14	40
20-64 years, females	14	40
65+ years, males	14	39
65+ years, females	14	39

Source:

Health and Welfare Canada, Nutrition Canada Food Consumption Patterns Report, 1975.

TABLE 34

Contribution to Total Calories by Carbohydrate, Fat and Protein in Diets of Families and Adults in Canada, 1941 and 1976

Year	Dietary Study	Percent Total Calories from		
		Protein	Fat	Carbohydrate
1941	Adults, 80 Toronto families ^a	13	37	50
1941	Adults, 82 Halifax families ^b	14-15	42	43-44
1945	63 Quebec farm families ^c	12	39	50
1976	Nutrition Canada, 6757 adults 20 to 65+ years ^d	14	39-40	46-47

^a J.M. Patterson and E.W. McHenry. "A Dietary Investigation in Toronto Families Having Annual Incomes Between \$1500-2400." Canadian Journal of Public Health, 32(5):251, 1941.

^b E.G. Young. "A Dietary Survey in Halifax." Canadian Journal of Public Health, 32(5):236, 1941.

^c Z.A. Hassan and D. Karamchandani. Handbook of Food Expenditures, Prices and Consumption. Agriculture Canada, 1976.

^d Health and Welfare Canada. Nutrition Canada Food Consumption Patterns Report, 1975.

TABLE 35

Per Cent Contribution of Food Groups to Protein
Intake of Different Age/Sex Groups in Nutrition
Canada National Sample from the General Population

Age Group	Dairy Products	Meat, Poultry, Fish, Eggs	Cereals	Fruits & Vegetables	Other
Children:					
1-4 yr	42	29	15	6	7
5-11 yr	32	32	20	6	9
Adolescents:					
12-19 yr males	26	38	19	7	9
12-19 yr females	25	37	19	7	10
Adults:					
20-39 yr males	16	52	16	7	8
20-39 yr females	19	48	18	7	7
40-64 yr males	16	48	18	6	10
40-64 yr females	17	49	18	8	7
65+ yr males	18	47	20	7	6
65+ yr females	22	40	22	8	6

^a Nutrition Canada Food Consumption Patterns Report.
Health and Welfare Canada, 1976.

surprising that values of 38 to 40 per cent calories from fat found in the Nutrition Canada survey for Canadian diets in 1970-72 are not very different from values of 37 to 42 per cent found in 1941-45, for diets of adults in Halifax and Toronto and for families in Quebec (Table 34). These data suggest that there has been little change in the proportion of fat calories in the diets of Canadians in the last thirty years.

Information from the Nutrition Canada survey on the proportions of saturated and polyunsaturated fatty acids in Canadian diets and on the intake of cholesterol is not yet available.

The per cent contributions of food groups to fat intake of persons in the Nutrition Canada survey is shown in Table 36. The food group consisting of meat, fish, poultry and eggs was a primary source of fat contributing from one-fourth to two-fifths of total dietary fat for adults and children over four years of age. The food group comprising fats and oils was the secondary source of fat for most age groups, contributing one-fifth to one-sixth total dietary fat. It is suggested that reduction in fat intake could most effectively be achieved by reduction in the intake of fatty meats (4).

5. Carbohydrate

5.1. Food Sources of Carbohydrate

The per cent contribution of different food groups to total carbohydrate intake of Canadians, as observed in the Nutrition Canada study, is shown in Table 37. The contribution to carbohydrate intake from the different food groups showed a similar pattern among adults of both sexes and all ages. Fruits contributed a higher proportion of total carbohydrates to diets of adult females (13 to 17 per cent) than males (10 to 11 per cent) while the food group classed as other contributed a higher proportion of carbohydrate to the diet of adult males (24 to 29 per cent) than females (19 to 26 per cent). Adolescents and children received a higher proportion of carbohydrate from dairy products than did adults.

5.2. Foods Mostly Sugar

Foods mostly sugar contributed approximately 13 per cent of carbohydrate and 7 per cent of total calorie intake for persons over 12 years of age (Table 38).

5.3. Fiber

Mean intake of crude fiber and per cent contribution to fiber intake from different food groups were determined for the Nutrition Canada sample (Table 39). At the present time information on fiber content of foods is primarily the crude fiber content. Unfortunately, crude fiber values cannot be directly related to values for dietary fiber which is the fiber classification of interest from the nutritional point of view (26). The food group comprising vegetables and potatoes was the primary source of crude fiber, contributing two-fifths to

TABLE 36

Per Cent Contribution of Food Groups to Fat Intake of Different Age/Sex Groups in Nutrition Canada National Sample from the General Population^a

Age Group	Dairy Products	Meat, Poultry Fish, Eggs	Cereals	Fruits & Vegetables	Fats & Oils	Other
Children:						
1-4 yr	33	25	14	7	13	8
5-11 yr	23	25	17	7	17	10
Adolescents:						
12-19 yr males	18	30	17	7	18	9
12-19 yr females	17	28	18	7	18	10
Adults:						
20-39 yr males	13	43	12	7	16	8
20-39 yr females	15	38	14	6	19	7
40-64 yr males	14	39	15	4	19	7
40-64 yr females	14	39	15	5	20	6
65+ yr males	15	38	16	3	21	5
65+ yr females	20	32	18	4	20	5

^a Nutrition Canada Food Consumption Patterns Report. Health and Welfare Canada, 1976.

TABLE 37

Per Cent Contribution of Food Groups to Total Carbohydrate Intake (Nutrition Canada Survey)^a

Age Group	Dairy Products	Meat, Poultry Fish, Eggs	Cereal Products	Fruits & Fruit Product	Vegetables & Potatoes	Other
Children:						
1-4 yr.	19	-	34	18	10	17
5-11 yr.	13	-	40	16	10	20
Adolescents:						
12-19 yr, males	12	-	42	9	12	24
12-19 yr, females	11	-	40	13	12	24
Adults:						
20-39 yr, males	8	-	39	10	14	29
20-39 yr, females	8	-	40	13	13	26
40-64 yr, males	7	-	43	10	12	27
40-64 yr, females	7	1	41	16	12	22
65+ yr, males	7	-	44	11	12	24
65+ yr, females	9	-	44	17	11	19

^a Nutrition Canada Food Consumption Patterns Report. Health and Welfare Canada, 1976.

^b Includes legumes and mixed dishes,

TABLE 38

Calories from Sugar, Soft Drinks, Beer and Wine as Per Cent of Mean Calorie Intakes for Age Groups in Nutrition Canada Sample^a

Age	Per Cent Mean Energy Intake from Sugar, Soft Drinks	Per Cent Mean Energy Intake from Beer & Wine
1-4 years	6	-
5-11 years	7	-
10-19 years, males	9	-
10-19 years, females	9	-
20-39 years, males	8	5
20-39 years, females	8	1
40-64 years, males	7	5
40-64 years, females	6	1
65+ years, males	7	1
65+ years, females	5	0.5

^a Nutrition Canada Food Consumption Patterns Report. Health and Welfare Canada, 1976.

TABLE 39

Per Cent Contribution of Food Groups to Intakes of Crude Fiber for Age/Sex Groups of Nutrition Canada National Sample from the General Population^a

Age Group	Crude Fiber Mean Intake g per day	Per Cent of Fiber Intake from		
		Cereal Products	Fruits	Vegetables & Potatoes
Children:				
1-4 years	2.4	21	27	37
5-11 years	3.6	21	26	36
Adolescents:				
12-19 years, males	4.4	22	15	42
12-19 years, females	3.4	19	20	42
Adults:				
20-39 years, males	4.6	20	16	50
20-39 years, females	3.2	20	17	49
40-64 years, males	4.2	25	19	43
40-64 years, females	3.4	20	25	43
65+ years, males	3.9	28	19	42
65+ years, females	3.3	26	26	39

^a Nutrition Canada Food Consumption Patterns Report. Health and Welfare Canada, 1976.

one-half of crude fiber intake for persons over twelve years of age while cereal products provided one-fourth to one-sixth of crude fiber intake.

6. Minerals

6.1. Calcium

Median intakes of calcium for different age groups and different regions in the Nutrition Canada survey are shown in Table 40. Median calcium intakes were generally adequate for all age groups except teen age girls. However, one-fifth of children, one-quarter of adolescent boys, one-third of adolescent girls, and one-fifth of adult women had calcium intakes below desirable levels.

Calcium intakes were not related to time of year or to rural or urban location. Some regional differences were apparent. Calcium intakes were lowest in Quebec and higher in the Atlantic provinces than in other provinces.

The primary source of calcium in diets of all ages was the dairy products group, which contributed over 50 per cent of calcium in diets of adults and up to 80 per cent of that in diets of children. Cereal products were a secondary source contributing 9 to 18 per cent of dietary calcium (Table 41).

Too few of the dietary studies of the 1940's provide information on actual calcium intakes of subjects to permit conclusions concerning trends in calcium nutriture. In many of these earlier studies calcium intakes of children, adolescents and to a lesser extent of adult women were reported at less than desirable levels (17, 18, 21, 23).

6.2. Iron

The Nutrition Canada survey (1) revealed widespread shortage of iron in the diets of Canadians. Iron was consumed at less than adequate levels by one-half the infants and toddlers, one-third of the older children, one-half to three quarters of the adolescent girls and adult women, one-quarter to one-third of the adolescent boys and adult men.

Median intakes of iron for different age and regional groups in the Nutrition Canada survey are shown in Table 42. Little regional difference was found with the exception of Newfoundland, where iron intakes for many age groups were somewhat higher than in other regions (3).

The major food groups contributing to iron intake were cereal products, which contributed 23 to 39 per cent of dietary iron at different ages and the group consisting of meat, fish, poultry and eggs, which contributed 21 to 43 per cent of dietary iron (Table 43). The enrichment of cereal products with iron undoubtedly plays a major role in the contribution of cereals to iron intake of Canadians.

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TABLE 40

Median Calcium Intake (milligrams per day) for
Different Age/Sex Groups in Nutrition Canada
National and Provincial Samples

	Children	Males				Females			
	1-4 ^b yr	10-19 yr	20-39 yr	40-64 yr	65+ yr	10-19 yr	20-39 yr	40-64 yr	65+ yr
National	879	1160	960	780	600	900	590	540	520
Newfoundland	---	1540	880	1030	960	940	920	730	710
Prince Edward Island	---	1200	1140	790	690	900	540	640	690
Nova Scotia	---	1130	960	790	780	1180	630	490	530
New Brunswick	---	1110	1070	820	650	980	610	560	480
Quebec	---	870	760	820	550	690	510	450	490
Ontario	---	1260	990	830	550	1020	600	600	580
Manitoba	---	1420	980	600	610	890	590	410	450
Saskatchewan	---	990	910	760	750	750	620	540	480
Alberta	---	1310	1010	660	570	940	700	540	450
British Columbia	---	1140	890	780	770	910	630	620	490

a Nutrition Canada Provincial, Eskimo and Indian
Surveys. Health and Welfare Canada, 1975.

b See footnote (b), Table 27

TABLE 41

Per Cent Contribution of Food Groups to Calcium
Intake (Nutrition Canada Survey)^a

Age Group	Dairy Products	Meat, Poultry, Fish, Eggs	Cereal Products	Fruits & Fruit Products	Vegetables & Potatoes	Other ^b
Children:						
1-4 yr	80	2	9	2	2	4
5-11 yr	72	2	12	3	3	7
Adolescents:						
12-19 yr, males	70	3	14	2	4	6
12-19 yr, females	66	3	14	3	4	9
Adults:						
20-39 yr, males	59	6	15	3	7	11
20-39 yr, females	61	5	15	3	7	9
40-64 yr, males	56	6	17	3	6	11
40-64 yr, females	54	6	17	5	7	9
65+ yr, males	56	6	18	4	7	8
65+ yr, females	58	4	18	5	7	8

a Nutrition Canada Food Consumption Patterns Report.
Health and Welfare Canada, 1976.

b Includes legumes and mixed dishes

TABLE 42

Median Iron Intake (milligrams per day) for
Different Age/Sex Groups in Nutrition Canada
National and Provincial Samples^a

	Children		Males				Females			
	1-4 ^b yr	5-9 yr	10-19 yr	20-39 yr	40-64 yr	65+ yr	10-19 yr	20-29 yr	40-64 yr	65+ yr
National	8	11	15	17	14	13	11	11	11	9
Newfoundland	-	12	16	19	14	17	14	18	12	10
Prince Edward Island	-	11	15	15	17	17	12	11	11	11
Nova Scotia	-	11	14	15	16	14	12	10	10	9
New Brunswick	-	10	14	17	14	11	12	11	10	10
Quebec	-	10	13	17	15	13	12	13	10	9
Ontario	-	10	16	18	14	11	10	11	12	11
Manitoba	-	12	14	17	15	13	10	12	10	8
Saskatchewan	-	13	16	17	15	14	11	12	12	9
Alberta	-	11	12	18	15	13	9	12	10	9
British Columbia	-	12	16	17	13	12	11	10	10	9

^a Nutrition Canada Provincial, Eskimo and Indian
Surveys. Health and Welfare Canada, 1975.

^b See footnote (b) Table 27

TABLE 43

Per Cent Contribution of Food Groups to Iron
Intake (Nutrition Canada Survey)^a

	Dairy Products	Meat, Poultry, Fish, Eggs	Cereal Products	Fruits & Fruit Products	Vegetables & Potatoes	Other ^b
Children:						
1-4 yr	2	21	47	9	9	10
5-11 yr	1	24	39	9	12	14
Adolescents:						
12-19 yr, males	2	31	36	4	12	15
12-19 yr, females	2	30	30	6	14	18
Adults:						
20-39 yr, males	2	43	23	4	13	14
20-39 yr, females	2	37	25	6	14	16
40-64 yr, males	1	35	28	6	12	17
40-64 yr, females	1	32	28	8	13	17
65+ yr, males	2	32	34	7	12	14
65+ yr, females	2	27	34	9	12	14

^a Nutrition Canada Food Consumption Patterns
Report. Health and Welfare Canada, 1976.

^b Includes legumes and mixed dishes.

Dietary studies carried out in Canada in the 1940's reported that inadequate levels of dietary iron were common among adult women and children but seldom among men (17, 18, 23). In 1941 average iron intakes of 10.6 and 12 mg per day were reported for women in Toronto (17) and Halifax (16), respectively. For comparison, average values of 11 to 13 mg per day were reported for young adult women in different regions by Nutrition Canada, with a national mean for this group of 12 mg iron per day (4). However, insufficient information on dietary levels is presented in the earlier studies for conclusions to be reached as to an overall trend in iron intake in the intervening years.

7. Vitamins

7.1. Vitamin A

In the Nutrition Canada survey median intakes of vitamin A for most age/sex groups were adequate (Table 44). Women had lower intakes of vitamin A than did males. Median intakes of middle-aged and elderly women were close to marginal levels. From one-fourth to one-third of adolescent and adult women and elderly men had inadequate intakes of this vitamin (1).

Differences among regions in vitamin A intake were slight (3).

Dairy products were primary contributors of vitamin A (26 to 34 per cent) to diets of children under 12 while the meat, fish, poultry and egg group was the primary contributor (22 to 42 per cent) of this vitamin to diets of other age groups (Table 45). Vegetables and fruits each contributed 12 to 20 per cent of Vitamin A consumed by all age groups

There is insufficient information on individual intake of vitamin A in dietary studies of the 1940's to assess trend with respect to this vitamin since then. Inadequate intakes of vitamin A were reported for some local studies at a rate of 15 to 20 per cent of individuals or families studied (21, 23).

7.2. Vitamin D

In the Nutrition Canada survey, dietary intakes of vitamin D were adequate for infants but taken at less than desirable levels by one-fifth to one-third of older children and adolescents (1). However, at these ages exposure to sunlight will also serve to provide this vitamin (22). No evidence of rickets resulting from lack of vitamin D was found.

Although data from earlier dietary studies do not permit assessment of change in intake of this vitamin, the decrease in prevalence of rickets is impressive. Evidence of past rickets due to vitamin D deficiency was found in 26 per cent of children in Canada surveyed in years 1946-51 (23).

TABLE 44

Median Vitamin A Intake (micrograms retinol equivalents per day) for Different Age/Sex Groups in Nutrition Canada National and Provincial Samples^a

	Children		Males				Females			
	1-4 ^b yr	5-9 yr	10-19 yr	20-29 yr	40-64 yr	65+ yr	10-19 yr	20-39 yr	40-64 yr	65+ yr
National	954	900	1050	1120	1060	820	780	790	690	710
Newfoundland	---	700	890	1000	940	650	650	740	790	700
Prince Edward Island	---	1000	1190	1520	1120	1050	910	780	1010	900
Nova Scotia	---	960	1110	1140	1220	1090	910	780	720	710
New Brunswick	---	1090	990	1320	1020	900	960	830	770	670
Quebec	---	930	1020	1070	1150	970	870	870	730	720
Ontario	---	920	1170	1190	990	600	710	680	630	700
Manitoba	---	940	1090	770	900	900	640	560	500	560
Saskatchewan	---	1040	920	1060	1060	900	680	760	770	640
Alberta	---	700	980	1350	1110	930	570	1140	670	870
British Columbia	---	780	990	1020	1100	960	850	720	740	730

^a Nutrition Canada Provincial, Eskimo and Indian Surveys. Health and Welfare Canada, 1975.

^b See footnote b, Table 27

TABLE 45

Per Cent Contribution of Food Groups to Vitamin A Intake (Nutrition Canada Survey)^a

	Dairy Products	Meat, Poultry Fish, Eggs	Cereal Products	Fruits & Fruit Products	Vegetables & Potatoes	Fats & Oils	Other ^b
Children:							
1-4 yr	34	22	2	3	16	12	9
5-11 yr	26	24	3	4	15	17	10
Adolescents:							
12-19 yr, males	23	26	3	2	13	21	10
12-19 yr, females	21	22	4	3	17	19	12
Adults:							
20-39 yr, males	17	37	2	2	17	17	6
20-39 yr, females	13	42	2	2	20	13	7
40-64 yr, males	16	27	2	4	21	20	9
40-64 yr, females	13	28	2	13	21	15	6
65+ yr, males	16	29	3	3	22	20	6
65+ yr, females	16	34	3	4	22	14	5

^a Nutrition Canada Food Consumption Patterns Report. Health and Welfare Canada, 1976.

^b Includes legumes and mixed dishes

At present time most milk sold in Canada, fluid or dried, is fortified with vitamin D, and this is probably the chief source of the vitamin in Canadian diets.

7.3. Vitamin C

Median intakes of vitamin C in the Nutrition Canada survey were well above recommended levels for all age/sex groups of the general population in all regions (Table 46). However, some adults and children, around 10 per cent of those surveyed, consumed less than desirable amounts of the vitamin (1,3). Generally differences among regions in intakes of this vitamin were slight.

No information from the Nutrition Canada survey on the relationship between income and food consumption patterns or between income and nutrient intake has, as yet, been published. However, serum levels of vitamin C, which closely reflect intake of this nutrient, indicated more persons with low serum levels of vitamin C among lower income than other income groups.

Fruits and vegetables were primary sources of vitamin C in diets of all age groups (Table 47). Women received larger proportion of dietary vitamin C from fruits and smaller proportion from vegetables than did men.

Earlier dietary studies reported intakes of vitamin C by families in Winnipeg in 1943 (18), farm families in Quebec in 1945 (21) and students Toronto in 1946 (19) ranging from 33 to 68 mg per person per day. It seems probable that, on average, intake of this vitamin has increased in the past 30 years, although small numbers of individuals still consume less than desirable amounts.

7.4. Thiamin, Riboflavin, Niacin

Median intakes of these vitamins (Tables 48-50) in the Nutrition Canada survey were above adequate levels for all age groups in all regions. However, median intakes of thiamin and riboflavin for middle-aged and elderly women were close to marginal levels (3) and some elderly men and women had inadequate intakes. Intakes of niacin were satisfactory for all age groups.

There were some slight differences among regions in intakes of these nutrients. For example, in Newfoundland median intakes of thiamin were higher and those of niacin lower than in other provinces; in Quebec thiamin and riboflavin intakes of some age groups were lower than those in other provinces.

Food groups contributing major portion of dietary thiamin and niacin (Tables 51 and 52) were the group of meat, fish, poultry and eggs and the cereal group, while these two food groups plus dairy products were major sources of riboflavin in Canadian diets (Table 53). The cereals group provided 30 to 40 per cent of thiamin, 15 to 25 per cent of riboflavin and 15 to 25 per cent of niacin in diets of different age

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TABLE 46

Median Vitamin C Intake (milligrams per day) for
Different Age/Sex Groups in Nutrition Canada
National and Provincial Samples^a

	Children		Males				Females			
	1-4 ^b yr	5-9 yr	10-19 yr	20-39 yr	40-64 yr	65+ yr	10-19 yr	20-39 yr	40-64 yr	65+ yr
National	84	85	80	94	81	67	69	70	81	79
Newfoundland	--	86	108	108	92	79	97	57	71	98
Prince Edward Island	--	76	64	79	76	73	65	75	73	88
Nova Scotia	--	73	87	60	72	78	71	67	56	61
New Brunswick	--	73	83	98	71	73	78	56	70	66
Quebec	--	82	78	92	81	54	65	74	81	69
Ontario	--	90	86	104	94	70	82	65	88	86
Manitoba	--	108	48	58	64	50	71	80	73	61
Saskatchewan	--	110	66	66	62	60	55	63	68	63
Alberta	--	83	72	130	87	59	60	71	66	73
British Columbia	--	81	94	90	78	84	56	69	82	79

a Nutrition Canada Food Consumption Patterns Report.
Health and Welfare Canada, 1976.

b See Footnote b, Table 27.

TABLE 47

Per Cent Contribution of Food Groups to Vitamin C
Intakes (Nutrition Canada Survey)^a

Age Group	Dairy Products	Meat, Poultry Fish, Eggs	Cereal Products	Fruit & Fruit Products	Vegetables & Potatoes	Other ^b
Children:						
1-4 yr	10	-	-	66	22	2
5-11 yr	7	-	1	61	28	3
Adolescents:						
12-19 yr, males	8	-	-	47	39	5
12-19 yr, females	6	-	-	56	33	4
Adults:						
20-39 yr, males	5	1	1	45	46	2
20-39 yr, females	4	1	-	52	40	2
40-64 yr, males	5	-	1	47	44	3
40-64 yr, females	3	-	-	61	32	2
65+ yr, males	6	-	1	47	45	1
65+ yr, females	4	1	-	62	31	1

a Nutrition Canada Food Consumption Patterns Report.
Health and Welfare Canada, 1976.

b Includes legumes and mixed dishes

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TABLE 48

Median Thiamin Intake (milligrams per 1000 Calories)
for Different Age/Sex Groups in Nutrition Canada
National and Provincial Samples^a

	Children		Males				Females			
	0-4 ^b yr	5-9 yr	10-19 yr	20-39 yr	40-64 yr	65+ yr	10-19 yr	20-39 yr	40-64 yr	65+ yr
National	0.57	0.52	0.49	0.45	0.46	0.52	0.47	0.48	0.50	0.57
Newfoundland	---	0.60	0.63	0.60	0.45	0.59	0.55	0.66	0.59	0.65
Prince Edward Island	---	0.46	0.58	0.42	0.46	0.50	0.46	0.47	0.48	0.47
Nova Scotia	---	0.52	0.50	0.48	0.45	0.48	0.49	0.49	0.49	0.57
New Brunswick	---	0.55	0.49	0.37	0.48	0.45	0.46	0.48	0.49	0.52
Quebec	---	0.50	0.44	0.44	0.44	0.51	0.42	0.46	0.49	0.54
Ontario	---	0.51	0.53	0.46	0.47	0.53	0.48	0.47	0.50	0.65
Manitoba	---	0.61	0.45	0.42	0.50	0.49	0.60	0.54	0.47	0.57
Saskatchewan	---	0.53	0.52	0.45	0.44	0.46	0.46	0.50	0.56	0.46
Alberta	---	0.44	0.47	0.46	0.55	0.56	0.50	0.59	0.55	0.51
British Columbia	---	0.52	0.52	0.46	0.44	0.54	0.47	0.49	0.51	0.60

^a Nutrition Canada Provincial, Eskimo and Indian
Surveys. Health and Welfare Canada, 1975.

^b See footnote b, Table 27

TABLE 49

Median Riboflavin Intake (milligrams per 1000
calories) for Different Age/Sex Groups in Nutrition
Canada National and Provincial Samples^a

	Children		Males				Females			
	1-4 ^b yr	5-9 yr	10-19 yr	20-39 yr	20-64 yr	65+ yr	10-19 yr	20-39 yr	40-64 yr	65+ yr
National	1.21	1.03	0.83	0.66	0.69	0.80	0.75	0.73	0.74	0.81
Newfoundland	--	0.64	0.65	0.65	0.69	0.53	0.57	0.69	0.65	0.71
Prince Edward Island	--	0.97	0.78	0.75	0.65	0.67	0.67	0.72	0.72	0.66
Nova Scotia	--	0.99	0.86	0.78	0.71	0.75	0.88	0.71	0.62	0.82
New Brunswick	--	0.95	0.82	0.66	0.82	0.74	0.74	0.64	0.70	0.83
Quebec	--	0.99	0.66	0.57	0.69	0.68	0.64	0.67	0.61	0.66
Ontario	--	1.06	0.98	0.66	0.66	0.81	0.82	0.75	0.81	0.93
Manitoba	--	1.16	1.00	0.73	0.67	0.67	0.96	0.67	0.65	0.95
Saskatchewan	--	1.04	0.79	0.90	0.71	0.69	0.74	0.83	0.74	0.82
Alberta	--	0.98	0.85	0.80	0.68	0.74	0.86	0.82	0.79	0.63
British Columbia	--	1.01	0.87	0.75	0.69	0.83	0.78	0.83	0.80	0.89

^a Nutrition Canada Provincial, Eskimo and Indian
Surveys. Health and Welfare Canada, 1975.

^b See footnote b, Table 27

TABLE 50

Median Niacin Intake (milligrams niacin equivalents per 1000 calories) for Different Age/Sex Groups in Nutrition Canada National and Provincial Samples^a

	Children		Males				Females			
	1-4 ^b yr	5-9 yr	10-19 yr	20-39 yr	20-64 yr	65+ yr	10-19 yr	20-39 yr	40-64 yr	65+ yr
National	14	12	13	14	13	13	12	14	14	14
Newfoundland	--	10	12	12	11	9	11	10	11	10
Prince Edward Island	--	12	12	13	13	12	12	12	14	12
Nova Scotia	--	12	13	13	12	12	11	18	13	12
New Brunswick	--	13	13	13	12	12	13	14	15	12
Quebec	--	12	12	13	13	13	11	13	13	12
Ontario	--	12	14	16	14	15	13	13	15	14
Manitoba	--	13	14	13	14	14	14	16	14	13
Saskatchewan	--	13	14	15	13	13	12	16	15	13
Alberta	--	12	12	16	15	14	14	16	15	15
British Columbia	--	13	13	13	14	16	13	14	16	14

^a Nutrition Canada Provincial, Eskimo and Indian Surveys. Health and Welfare Canada, 1975.

^b See footnote b, Table 27

TABLE 51

Per Cent Contribution of Food Groups to Thiamine Intake (Nutrition Canada Survey)^a

Age Group	Dairy Products	Meat, Poultry, Fish, Eggs	Cereal Products	Fruits & Fruit Products	Vegetables & Potatoes	Other ^b
Children:						
1-4 yr	23	14	36	8	11	6
5-11 yr	17	15	40	8	13	7
Adolescents:						
12-19 yr, males	14	22	37	4	15	7
12-19 yr, females	14	21	32	8	16	9
Adults:						
20-39 yr, males	9	33	29	6	17	5
20-39 yr, females	9	29	30	8	17	6
40-64 yr, males	8	27	34	6	15	10
40-64 yr, females	8	22	33	11	17	7
65+ yr, males	8	24	40	6	17	5
65+ yr, females	10	19	39	10	16	5

^a Nutrition Canada Food Consumption Patterns Report. Health and Welfare Canada, 1976.

^b Includes legumes and mixed dishes

PART III

TABLE 52

Per Cent Contribution of Food Groups to Niacin Intake (Nutrition Canada Survey)^a

Age Group	Dairy Products	Meat, Poultry, Fish, Eggs	Cereal Products	Fruits & Fruit Products	Vegetables & Potatoes	Other ^b
Children:						
1-4 yr	29	32	21	3	8	7
5-11 yr	21	35	23	2	9	10
Adolescents:						
12-19 yr, males	16	41	21	1	9	11
12-19 yr, females	16	42	20	2	10	10
Adults:						
20-39 yr, males	9	51	15	1	9	14
20-39 yr, females	11	51	17	2	9	10
40-64 yr, males	9	47	18	2	8	15
40-64 yr, females	10	49	18	3	8	11
65+ yr, males	11	47	21	2	9	9
65+ yr, females	13	43	24	3	8	8

a Nutrition Canada Food Consumption Patterns Report. Health and Welfare Canada, 1976.

b Includes legumes and mixed dishes.

TABLE 53

Per Cent Contribution of Food Groups to Riboflavin Intake (Nutrition Canada Survey)^a

Age Group	Dairy Products	Meat, Poultry, Fish, Eggs	Cereal Products	Fruits & Fruit Products	Vegetables & Potatoes	Other ^b
Children:						
1-4 yr	58	11	22	2	3	3
5-11 yr	48	14	26	2	4	5
Adolescents:						
12-19 yr, males	44	17	26	1	5	6
12-19 yr, females	45	18	21	2	5	8
Adults:						
20-39 yr, males	31	30	17	2	7	11
20-39 yr, females	32	28	20	2	7	9
40-64 yr, males	30	25	22	3	6	13
40-64 yr, females	29	25	23	4	8	10
65+ yr, males	30	24	27	3	7	9
65+ yr, females	33	21	26	4	6	9

a Nutrition Canada Food Consumption Patterns Report. Health and Welfare Canada, 1976.

b Includes legumes and mixed dishes.

groups, emphasizing the contribution made by enrichment of flour and other cereal products with these vitamins (4).

Again, too few of the earlier studies provide data on actual intake of these nutrients to permit definite conclusions concerning trends in intake. However, dietary inadequacies of thiamin (vitamin B₁) and riboflavin (vitamin B₂) were frequently reported in studies in the 1940's and early 1950's (17, 19, 23). Such intakes of thiamin as were reported, 0.27 and 0.39 mg per 1000 calories (18, 19) are lower than median intakes, 0.42 to 0.54 mg per 1000 calories, reported by the Nutrition Canada survey (3).

7.5. Folic Acid

The Food Consumption Patterns Report of the Nutrition Canada series (4) has provided information on intakes of folic acid that was not available earlier, due to incomplete information on folic acid content of foods. Some uncertainty must still exist with respect to dietary levels of folic acid and their interpretation. Mean intakes of free folic acid for all age groups in all regions were below recommended levels (4). Although a high prevalence of low blood levels of this vitamin were found there was little clinical evidence of folate deficiency anemia (1) and it has been suggested that dietary total folic acid content may be adequate (4).

The distribution of mean intakes of the vitamin reveals a similar pattern in all regions with the exception of 12 to 19 year old males and females in Quebec, who had lower intakes than did this age group in other provinces (Table 54).

The contribution of different food groups to dietary folate shows that for all age groups cereal products, fruits and vegetables each contributed from around one-fifth to one-fourth of dietary folate content (Table 55). Fruits contributed a higher proportion of the vitamin to diets of adolescent and adult females than of males. Dairy products were primary sources of folate in diets of children.

There has as yet, been no published report from Nutrition Canada on the relationship between income level and nutrient intake. However, poor folic acid status evaluated on basis of serum levels of the vitamin was more prevalent among persons of lower economic status, especially among low income middle-aged women and elderly men (2).

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- (2) Health and Welfare Canada, Nutrition Canada Report on the Relationship Between Income and Nutrition, Bureau of Nutritional Science, Ottawa 1974.
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TABLE 54

Mean Intakes of Free Folate and Total Folate^a
(micrograms per day) for Different Age Groups and
Regions of the Nutrition Canada Survey^b

	Children		Males				Females			
	1-4 yr	5-9 yr	12-19 yr	20-39 yr	40-64 yr	65+ yr	12-19 yr	20-39 yr	40-64 yr	65+ yr
National	77 (122)	90 (160)	109 (210)	118 (221)	95 (183)	79 (151)	84 (153)	83 (146)	88 (148)	74 (130)
Atlantic	66 (109)	89 (168)	105 (213)	108 (200)	90 (188)	81 (159)	82 (163)	78 (142)	63 (122)	65 (121)
Quebec	90 (140)	94 (166)	87 (175)	120 (219)	94 (179)	74 (143)	74 (147)	83 (153)	105 (163)	72 (129)
Ontario	78 (121)	88 (154)	127 (238)	120 (228)	100 (184)	82 (148)	99 (165)	86 (144)	89 (150)	82 (135)
Prairies	62 (102)	82 (155)	105 (200)	120 (226)	89 (181)	76 (156)	77 (138)	81 (145)	68 (126)	67 (123)
Pacific	73 (109)	95 (164)	122 (225)	115 (211)	98 (186)	86 (159)	81 (146)	78 (142)	89 (154)	73 (131)

a Total folate shown in brackets.

b Nutrition Canada Food Consumption Patterns Report.
Health and Welfare Canada, 1976.

TABLE 55

Per Cent Contribution of Food Groups to Free Folate
Intake (Nutrition Canada Survey)^a

Age Group	Dairy Products	Meat, Poultry, Fish, Eggs	Cereal Products	Fruits & Fruit Products	Vegetables & Potatoes	Other
Children:						
1-4 yr	37	8	13	24	13	4
5-11 yr	29	9	18	20	17	6
Adolescents:						
12-19 yr, males	27	12	21	13	19	7
12-19 yr, females	24	10	17	21	20	7
Adults:						
20-39 yr, males	16	17	17	18	26	6
20-39 yr, females	16	16	16	22	25	4
40-64 yr, males	16	14	20	17	26	6
40-64 yr, females	12	12	15	31	26	3
65+ yr, males	16	14	22	16	28	4
65+ yr, females	15	13	18	25	25	3

a Nutrition Canada Food Consumption Patterns Report.
Health and Welfare Canada, 1976.

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- (4) Health and Welfare Canada, Bureau of Nutritional Sciences, Nutrition Canada Food Consumption Patterns Report, Ottawa, 1976
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ASSESSMENT OF AVAILABLE INFORMATION
AND POLICY IMPLICATIONS



1. Dealing with Uncertainties

The preceeding three sections have presented information about food trends in Canada at aggregate and large group levels of analysis. Three distinct and separate points of measurement are represented. In Part 1, on food disappearance, the point of measurement is food leaving the wholesale level and destined for domestic retail distribution. In Part 2, on food expenditure, the measurement is made at the retail level in terms of consumer spending in dollars. In Part 3, on nutrient intake, the point of measurement is consumers' reported food intake and their measured biochemical and physiological status. While scientific links between these three sets of data are not theoretically or practically possible, conceptual links are both possible and necessary. The purpose of this section is to assess the meaning of the data presented in the three previous sections, to conceptually combine them, and to suggest policy and research implications which flow from such assessment.

The meaning of food trends in Canada is affected by the perceiver's style of reasoning and risk handling. If data are inappropriate or incomplete one can: (1) suspend judgement and do nothing; (2) conclude that a hypothesis is true and accept the possibility that it may later be proven false (Type II Error); or (3) reject the hypothesis and accept the possibility it may later be proven true (Type I Error).

To illustrate these different styles, assume that one is testing an hypothesis that the nutrient intake of Canadians has not changed in the last 25 years and is nutritionally sound, and that the available evidence is of questionable appropriateness and incomplete. A true conservative would answer that the hypothesis can be neither accepted nor rejected, and would suspend judgement. Alternatively, one could argue that since evidence to the contrary is not overwhelming we must accept the hypothesis. Finally one could argue that because evidence supporting the hypothesis is not overwhelming it should be rejected. The choice of style can only be made on the basis of the perceived consequences which might occur as a result of the decisions required by the choice made. The authors of this report have chosen to follow the third style, and tentatively conclude that significant changes have occurred in the nutrient intake of Canadians and the diet for some segments of the population is nutritionally unsound.

The authors accepted this conclusion because other evidence suggests that the economic and social consequences of suspended judgement or concluding that Canadian diets are nutritionally adequate are much less acceptable than the economic and social consequences of concluding that the diets of some Canadians are not nutritionally sound, should either of these prove to be false. For example, the future cost of concluding that the nutrient intake and food choice practices of many Canadians are not acceptable, is the expenditures on programs designed to alter food choice practices which hopefully may amount to several hundreds of millions of dollars per year. On the other hand the future cost of concluding that Canadian nutrient intake and food choice practices are acceptable, may amount to several billions of dollars per year. (See Appendix II.)

Data, like words, have no meaning, but people have meaning for both data and words. As beauty (or ugliness) is in the eye of the beholder, so meaning resides in the mind of the perceiver. The meaning derived from the data presented in the three previous sections depends upon the characteristics of the person(s) interpreting it, his or her perspectives, knowledge, experience, needs, wants and interests. Therefore, the meaning and the importance of food trends in Canada will be different for the agricultural producer, the food processor, the restaurateur or food franchiser, the consumer, the nutritionist, the dietician, the doctor, the retailer, the civil servants in ministries of agriculture, health and consumer affairs, and the politician. Each has different perspectives, interests, goals and wants. Inevitably, conflict will occur between the perspectives and interests of the various individuals and institutions involved in the food system. A growth in the consumption of one food commodity means a decrease in some others. A lower price for consumers often means less return for the producer. Consumer acceptance of a less nutritious, more expensive or cheaper product may mean future nutrition-related illness and health cost.

2. Underlying Premises

What perspective then does this report employ to assess the meaning of food trends in Canada and to perceive policy and research implications? Obviously, the perspective cannot be that of any one type of individual or institution in the food system. Rather this assessment is founded on the perspective revealed by the following premises;

- 1 A food policy must strive to maximize the total welfare of all individuals and institutions in the food system.
- 2 Welfare includes both economic and quality-of-life components.
- 3 Policy must serve long-term economic and quality-of-life considerations if it is to maximize total welfare. Policy serving immediate economic considerations is short-sighted and will often lead to dysfunctional long-term quality-of-life and economic consequences (i.e. the medical costs of treating life-style illness related to unsound food consumption may quickly erase any short term economic benefits. See Appendix II.)
- 4 Policy must be framed to intervene with problems at the appropriate level. Thus, policy should not be developed and applied at an aggregate or macro level if the states of affairs it strives to deal with are at a disaggregate or micro level.
- 5 The highest priority in food policy must be placed on those aspects of food consumption related to health and the quality of life, because the long-term economic (medical costs, lost productivity and consumers paying more than needed for an adequate diet) and quality-of-life consequences of nutritionally unsound food consumption patterns are extremely great. (See Appendices I and II.)

Assuming the reader agrees with these premises, the trends in food consumption revealed in the previous three sections can now be assessed.

The reader is reminded of the limitations and incompleteness of the data available for describing food trends stated in each of these previous sections.

3. Assessment

A number of important observations and generalizations are apparent in the trend and survey data representing the last 25 years.

3.1. Food Disappearance Data

- 1 Pronounced increases have occurred in the per capita disappearance of red meats, poultry, fresh fruit, vegetable oils and fats, and carbonated and alcoholic beverages.
- 2 General decreases have occurred in the per capita disappearance of cereal and dairy products, excepting cheese and ice cream.
- 3 Little change has occurred in per capita disappearance of pulses and nuts, refined sugar, potatoes, tea, coffee and cocoa.
- 4 Dramatic increases have occurred in the shipment of processed and manufactured food products.
- 5 Dramatic increases have occurred in the volume of food eaten away from home in restaurants and from vending machines.

Fats and oils provide few nutrients in relation to calories, while milk, cereals and potatoes contain greater variety and levels of nutrients. Red meats, fresh fruits, and cheese are relatively high-cost foods compared to cereals, vegetables and other cheaper foods which are also good sources of nutrients. In spite of a lack of evidence, one may question the nutritional adequacy of the meals consumed in restaurants, fast food chains and from vending machines and also the variety and levels of nutrients in some types of processed and manufactured foods and beverages, all of which tend to be more expensive than meals or food eaten at home, or the foods and the beverages they replace in the diet. These factors suggest significant change in types and forms of foods consumed by Canadians. They also suggest that we are paying more than needed for an adequate diet.

3.2. Food Purchase Data

The food purchase data are not very informative about food trends in Canada but do reveal that wide variations in food purchase patterns exist between different population segments;

- 1 Food costs in constant dollars vary widely in different cities, by regions, family size and income levels, and fluctuate significantly over time.
- 2 Per capita expenditures for food vary inversely with family size.
- 3 Proportion of food-dollar expenditures for dairy products, canned, dried and fresh fruits and vegetables, and cereals products has declined.
- 4 Proportion of food-dollar expenditures has increased for fats and oils, food away from home and frozen food.
- 5 Proportion of food dollar expenditures for meat, poultry products, and fish show no significant change.

- 6 Dollar expenditures for food purchased away from home, processed and prepared foods, low fat milk, expensive meat cuts, lamb, veal, and generally two-thirds of food classes are positively related to income level.
- 7 Proportion of food-dollar expenditures for eggs, fish, beverages, and fruit and vegetables is negatively related to income level.
- 8 The quantities purchased of fluid milk, powdered skim milk, bread, minced beef, margarine, canned baked beans, potatoes and frozen peas are not related to income.

Overall, the food purchase data indicate a shift toward increasing consumption of more expensive food and away from cheaper foods which are also good sources of nutrients, and to increasing food consumption away from home. These data also point out that food purchase patterns vary widely on a number of factors (region, family size, income and city of residence) and therefore, from a health and quality-of-life point of view, the issues in food consumption are selective and not general.

3.3 Nutrient Intake Data

From the perspective of health implications, nutrient intake data are more valid than disappearance or food purchase data. However, little reliable trend data are available. Nevertheless, the following generalizations appear reasonable.

- 1 The mean caloric intake of Canadians has shown little change from the early 40's to the present.
- 2 The proportions of caloric intake derived from protein, fat and carbohydrate has not changed significantly between the early 40's and the present.
- 3 The prevalence of overweight appears to have increased over the last 25 years.
- 4 The caloric intakes for some population segments are relatively low, giving rise to concern for the nutrient adequacy of their food intake.
- 5 Inadequacies in intake of certain vitamins and minerals exist for certain sex and age groups, but there are little data from previous years to establish trends.
- 6 The proportion of dietary calories taken in the form of fat is greater than desirable.

Although there are no data on caloric expenditures, if one assumes that current life styles are more sedentary than 25 years ago the increased prevalence of overweight is explained in that with declining caloric expenditures but stable caloric intakes, overweight conditions could be expected to increase.

In addition to overweight, which appears to have increased over the last 25 years, the nutrient intake data suggest that: (1) 25 years ago many Canadians had diets which were less than adequate in macro-nutrient proportions or micro-nutrient contributions; and (2) currently, while some changes have occurred, especially in micro-nutrient deficiencies, the diets of many Canadians remain nutritionally unsound.

4. Overview and Implications^{*}

Given that the health consequences (medical costs, lost productivity and quality of life) attributable to food consumption patterns take some years to surface:

Given that the dietary intakes of some Canadians even 25 years ago were inadequate;

Given that the food trends over the intervening 25 years indicate increasing consumption of higher cost foods and decreasing consumption of lower cost nutritional foods;

Given the increase in food eaten away from home and from vending machines;

Given the increasing consumption of processed and manufactured foods;

Given that caloric intakes remain relatively low for some groups;

Given that the proportion of caloric intake from fat is higher than desirable;

Given that the prevalence of overweight is increasing;

Given that the dietary intakes of some Canadians are currently inadequate;

Given the increase in consumption of alcoholic and carbonated beverages;

Given that food purchase patterns vary widely by region, size of family, income, occupation, etc; and,

Given that overweight and poor nutrition are found selectively in the population;

the following conclusions and policy implications are suggested.

- 1 From the perspective of health and its long-term economic and quality-of-life consequences, some Canadians were engaging in unsound food choice practices 25 years ago. In the intervening 25 years the number of Canadians engaging in unsound food choice practices is increasing and the general quality of food choice practices would appear to be decreasing. Canadians are also spending more money for food by buying higher cost foods and decreasing their consumption of cheaper foods

* An explanation of the reasons underlying the above noted changes in consumer food choice and the apparent lack of improvement in nutritional quality falls outside the terms of reference of this report. It is sufficient to note for our purposes here that some evidence on these questions is available and could well serve as the basis for a separate review and report.

which are also good sources of nutrients. Given the one or two generation lag in health consequences attributable to food consumption patterns, we as a nation can expect continuation in excessively high food-related health costs, lost productivity and a lower than necessary quality of life to continue in the next generation.

- 2 Since Canadians have freedom to choose as they wish from the food supply available, and since there is an abundance and greater variety of nutritious as well as non-nutritious food available in the current food system than ever before, and since the science of nutrition is not yet developed sufficiently to allow wholesale modification of the food supply, the only viable direction for a food policy to take is to attempt to alter the nature of the food selections many Canadians choose from the marketplace. There are three basic approaches for altering food choice patterns of populations:
 - (a) Ban the sale of foods with no redeeming nutritional value by legislative means;
 - (b) Alter the economic parameters of food choice by severely taxing foods of low nutritional quality or by subsidizing high nutrient foods generously, or both; and
 - (c) Develop programs aimed at making Canadians with unsound food choice practices aware of the health-related inadequacies of their food choice patterns, and then educate, persuade and motivate them to voluntarily change their food choice patterns from those currently followed to food choice patterns which are both lower in health risk and more economical in food cost.

In terms of achieving the desired goal of more adequate food consumption patterns the first alternative is probably faster, more effective and more philosophically and politically controversial. The second alternative is slower, probably effective and somewhat less controversial. The last alternative is probably very slow, not very effective and more acceptable from a political viewpoint.

- 3 Since inadequate food consumption patterns are selective, affecting not all but only some segments of the population in different ways, a food policy which is applied at the macro level is least desirable, for it would not recognize important variations and differences. Therefore any food policy would also best be selective in nature. It should be, to use an old analogy, a rifle aimed at specific targets, rather than a shotgun aimed in the general vicinity of the target. In this respect the first and second approaches discussed in conclusion #2 above are inappropriate, for they are not selective in their nature. They would treat all Canadians alike. The third alternative, however, can be very selective, picking out specific population segments and picking out specific food consumption problems and treating them with customized programs.

To conclude, the food consumption trends presented in this report indicate, from a health perspective, that the food consumption patterns of some Canadians have been and still are nutritionally unsound and no

improvement is occurring. A food policy is needed which employs the health aspect as its primary perspective and in doing so accounts for the long-term economic and social interests of Canadian consumers. Any policy developed must recognize the need for selectivity in dealing with inadequate food consumption patterns and not attempt to treat all Canadians alike for indeed, with respect to food consumption and its health and quality-of-life consequences, they are different.



IDENTIFIED NEEDS FOR RESEARCH
AND PRIORITIES



17

Through this study it has become apparent that the knowledge base for assessing changes in dietary consumption and nutrient intakes in Canada is limited, periodic, and in some cases, particularly for trend data, has not fully kept pace with changing patterns of eating and food selection.

In addition, it has been shown that although the nutrient intake as an aggregate for the population may not have altered substantially over the past 25 years, certain segments of Canadians may be jeopardizing health and quality of life through unsound and inappropriate nutritional intakes as a result of past and current food consumption practices. Indications are, based on trends identified, that these same practices may continue into the future. For those groups having less than optimum nutrient intakes, a method of altering food consumption behavior toward more socially and economically acceptable patterns must be found. This is necessary if the apparent trends in food consumption and nutritional status for certain segments of the population are to be reversed or changed in the direction of improved quality of life. These are some elements that must be considered in assessing the need for development of a comprehensive food policy for Canada.

To permit knowledgeable development of direction and the necessary degree of change in consumer behavior in relation to food consumption patterns, the following research needs are identified as high priority. It is recognized that these objectives are broad in scope. However, they do focus a need and point a direction for research, the results of which must be considered in the development of an enlightened national food policy.

- 1 More precisely identify those segments of the Canadian population who are jeopardizing their health and quality of life as a consequence of their food selection patterns. Identification of these segments should not be based solely on demographic data but more importantly on attitudes, knowledge, and beliefs towards foods, nutrition and health. These latter three types of variables are explanatory as well as descriptive of consumer behavior, whereas demographic data tend to be limited to a descriptive function.

The Nutrition Canada study identified groups of Canadian categorized as "at risk" based on physiological and biochemical measures and standards of nutritional health. However, it is insufficient to know that a certain segment of the population is "at risk". One must also know why that segment engages in food choice patterns which may jeopardize health and quality of life. To design programs aimed at altering food choice behavior, this objective can only be achieved if explanatory variables are included in the research design to more precisely identify those segments who are engaging in inadequate food choice practices and then interpret the reasons behind their behavior.

- 2 Identify and develop approaches and methods of altering consumer food-choice patterns that could provide models to effectively alter food

consumption and nutrient intake of those segments of Canadians identified as engaging in unsound food choice practices. To effectively alter food consumption and nutrient intake patterns, models for modifying behavior need to be developed, tested and implemented based on psychographic as well as demographic descriptions of the various segments identified. From the perspective of health and its long-term economic and quality-of-life consequences, some Canadians were apparently engaging in unsound food choice practices 25 years ago. In the intervening 25 years the number of Canadians engaging in unsound food choice practices would appear to have increased and the quality of food choice practices to have declined. For a variety of reasons, different segments of the population may make inappropriate food choice decisions with their concomitant effects over time one personal health and quality of life. In order to effectively alter food consumption behavior and nutrient intake patterns, selective approaches to behavior alteration are necessary to motivate the various segments to behavior change in food choice decisions.

- 3 Establish a planned and integrated information system to monitor over time nutrient intake, actual consumption of foods of all types, and nutritional status of Canadians to provide time series data. This system would ensure a valid and reliable data base for periodic, comprehensive and consistent assessment of food consumption and concomitant nutrient intake in relation to nutritirional status of the population.

It has become apparent during the preparation of this report that current information bases for dietary consumption and nutrient intakes in Canada are limited, periodic and in some cases, particularly for trend data, have not kept pace with changes that have occurred in more recent years in changing patterns of eating, food selection and food-waste generation. In order to consistently measure changing patterns of food consumption and nutrient intake and concomitant general health and quality of life aspects, an integrated information system must be developed to monitor over time the food "health" of Canadians. Information from such a system will be useful in assessing progress in altering food choice behavior and providing feedback to modify and improve programs for altering behavior as well as providing trend data that are consistent in their measure of food consumption and nutrient intake.

These research objectives should be given highest priority. However, there are other shorter term areas where further research would confirm or deny some of the concepts developed in this paper from available but limited data bases. These specific research areas are:

- 1 Re-assess trends from food disappearance data as revisions to time series data which are currently being developed by Statistics Canada for some categories are reported. This re-assessment will aid in confirming trends and tentative conclusions drawn in this report.

-
- 2 Assess revised time series data for nutrient availability based on food disappearance statistics including both macro and selected micro nutrients which are currently being calculated by the Economics Branch of Agriculture Canada.

Similarly, assess from calculated nutrient levels based on food expenditure survey data for 1969 and 1974 when reported by the Economics Branch, the contribution to nutrient intake derived from unprocessed, processed and manufactured foods and foods consumed away from home to confirm trends suggested in this report.

- 3 Examine raw data from food expenditure surveys and the Nutrition Canada survey, particularly in relation to manufactured foods and foods consumed away from home, to develop an assessment of the contribution to nutrient intake of these types of foods and eating occasions.



HEALTH CONSEQUENCES OF
UN SOUND EATING PRACTICES

Eating practices, the type and quantity of food consumed, are the chief determinants of individual nutritional status and thus a major influence on health. Unsound eating practices encompass both over-consumption, especially of calories, fat, saturated fat, sugar and alcohol, and under-consumption of nutritious food, leading to nutrient deficiencies.

In Canada and other affluent countries several major health problems are associated with over-consumption of food and unwise choice of food. Addressing the Canadian Public Health Association in June 1977, the Honourable Marc Lalonde (1), at that time Minister of National Health and Welfare, called cardiovascular disease "perhaps the greatest health problem facing Canadians to-day", in large measure a self-inflicted problem due to "unwise lifestyles" which include overeating and wrong eating habits. In a statement accompanying the Dietary Goals for the United States published by the Senate Select Committee on Nutrition and Human Needs, Hegsted (2) described the American diet as "rich in meat, in other sources of saturated fat and cholesterol, and in sugar" adding that "this diet which affluent people generally consume is everywhere associated with a similar disease pattern - high rates of ischemic heart disease, certain forms of cancer, diabetes and obesity". These conditions of diet and associated diseases occur also in Canada.

In 1976 the Committee on Diet and Cardiovascular Disease appointed by the Department of National Health and Welfare published a report (3) in which are reviewed the risk factors in coronary heart disease and their relationship to diet. The Committee has recommended the following changes in the Canadian diet: (a) a reduction in calories from fat to 30 to 35% total calories, mainly as a decrease in saturated fat; (b) a partial substitution of polyunsaturated for saturated fat; (c) a reduction in dietary cholesterol intake to 400 mg daily or less; (d) a diet which contains less alcohol, salt, refined sugars, and more whole grain products, fruits and vegetables; and (e) the prevention and control of obesity through reducing excess calories and increasing physical activity.

Obesity and overweight afflict large numbers of Canadians (4). Obesity is known to be associated with an increased risk of mortality (5,6). Obesity has been shown to be associated with an increased risk of several disease conditions including atherosclerosis, hypertension, diabetes, coronary heart disease and gallstones (7,8). Obesity increases the work of breathing and the metabolic cost of physical activity and may aggravate pulmonary conditions such as emphysema (9).

Since sugars and sweets are concentrated sources of energy, their consumption in large amounts may increase the likelihood of excess energy consumption and thus of obesity. Sugars, especially sucrose, encourage dental caries (10). Sucrose consumption is regarded as one of the major determinants of prevalence of dental caries (11).

Concern has been expressed about the progressive increase in per capita consumption of alcohol in Canada. Not only does alcohol have an adverse

effect on cell function but it may displace nutritious foods from the diet (12).

There is increasing evidence that certain types of cancer may be associated with diet factors. High levels of fat in the diet have recently been related to cancer of the colon, pancreas, kidney, breast, ovary endometrium and prostate (13). It is suspected that certain nutritional deficiencies such as iodine, riboflavin, vitamin A and pyridoxine may be related to cancer development in certain organs (13). Although alcohol is not considered a causative factor for cancer, it has been shown to increase the risk of smokers developing cancers of the mouth, larynx and esophagus (13).

Under-consumption of nutrients leading to deficiency diseases such as scurvy, beri-beri and rickets is seldom encountered nowadays and these diseases were not found in the Nutrition Canada survey (4). However, sub-optimal states of nutrition with respect to iron and folic acid were fairly prevalent. Moderate deficiencies of certain other nutrients as vitamin C and thiamin were observed among individuals in some population segments. The health consequences of marginal or sub-optimal nutrient intakes are difficult to quantify. Iron deficiency anemia reduces physical work capacity in adults (14). It has been suggested that anemia is associated with changes in behaviour such as decreased attentiveness, narrower attention span, decreased persistence and decreased voluntary activity (15).

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ESTIMATIONS OF MEDICAL,
PRODUCTIVITY AND SOCIAL COSTS
RELATED TO NUTRITIONALLY UNSOUND
FOOD CONSUMPTION PRACTICES

The direct costs of nutritionally unsound food consumption practices cannot be generated by precise cost-accounting techniques for a variety of reasons. Nevertheless, the potential magnitude of these costs demands estimation in order to determine the severity of the problem being faced, the necessity for action programs of some kind, and the potential benefits which such programs might generate. Several attempts at estimating the magnitude of the medical, productivity and social costs of Canadian food choice practices have been made in the last few years. These attempts vary in their assumptions, methods, completeness and findings.

The most comprehensive estimation attempt was made by Sabry (1). As seen in Table 56, the total estimated medical and productivity costs for 1970 (not including the important category of lowered productivity of workers on the job) is almost \$8 billion. The estimated proportion of this cost which could be recovered by improved nutrition is approximately 31 per cent or \$2.5 billion, per year.

In 1975 Blanchet (2) estimated that the cost of treating nutrition related illness in Quebec in 1974-75 was more than \$150 million.

The Honorable Lalonde (3) provided estimates in 1977, that the cost of heart disease in 1973, which is highly related to life style and diet, exceeded \$1 billion for hospitalization, \$50 million in lost wages and \$2.5 billion in lost productivity due to premature death.

In 1977 Hiscocks (4) provided cost estimates for 1976 of \$2.28 billion as a result of absenteeism due to illness and \$2.6 billion for medical costs.

Social costs are not measured in dollars but rather in terms of prematurely lost loved ones, pain and suffering, lost opportunities and a lowered quality of life, (enjoyment of living). These social costs are of serious magnitude, given the numbers of people suffering with nutrition-related illnesses, and the numbers of people who are incapable of partaking in many of life's opportunities and pleasures because of nutrition-related poor health status.

The future appears even more disturbing. Blanchet (2) estimates that 25 per cent of personal income will be required for medical costs by the year 2000 if the current trends continue. Hiscocks (3) projects an increase in the incidence of nutrition-related illnesses and a geometric increase in the costs of new medical technology which, when combined with the changing age distribution of the population, will create severe economic strains that the society may not be able to afford.

Although some may debate the method, validity, or accuracy of the estimations provided above, the conclusion is still obvious. The magnitude of the medical, productivity and social costs of nutrition related illness are extremely great and, if current trends continue, will become even a greater proportion of GNP. This state of affairs

demands action to ameliorate the economic costs and human suffering our short-sighted life styles have created.

Improvements in the nutritional quality of food consumption practices, no matter how achieved, will not be evidenced by significantly lowered health, productivity and social costs for one to two generations.

Nevertheless, the action required must be to invest current dollars in programs which will generate savings much later. Following this vision Sabry (1) suggests we should be willing to spend \$250 million a year on programs to improve nutrition if a benefit to cost ratio of ten to one could be achieved. This means a 1000 per cent return on investment. Surely even a benefit to cost ratio of two to one, or 100 per cent on investment, is justifiable.

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TABLE 56

Cost of Malnutrition in Canada and Potential Savings from Improved Nutrition

Cost Item	Level of Cost \$	Potential Savings from Improved Nutrition % of cost ¹	\$
<hr/>			
Hospitalization			
Anaemias and other nutritional deficiencies ^a	13,800,000	100	13,800,000
Cirrhosis of the liver ^a	12,327,000	33	4,109,000
Obesity ^a	3,833,000	80	3,066,000
Diabetes ^b	53,151,000	50	26,576,000
Heart and vascular diseases ^b	258,901,000	20	51,780,000
Digestive system diseases ^c	249,982,000	25	62,495,000
Respiratory system diseases ^b	165,778,000	20	33,156,000
Uro-genital diseases ^c	158,371,000	20	31,674,000
	<hr/>		<hr/>
	916,143,000		226,656,000
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Medical Care			
Anaemias and other nutritional deficiencies ^d	2,163,000	100	2,163,000
Cirrhosis of the liver ^a	1,931,000	33	644,000
Obesity ^a	8,245,000	80	6,596,000
Diabetes	9,408,000	50	4,704,000
Heart and vascular diseases ^e	34,868,000	20	6,974,000
Digestive system diseases ^d	41,529,000	25	10,382,000
Respiratory system diseases ^d	27,540,000	20	5,508,000
Uro-genital diseases ^d	26,310,000	20	5,262,000
	<hr/>		<hr/>
	151,994,000		42,233,000

a Extrapolated from data on Quebec from 1971 (Reference 15), for care at hospitals and doctors' offices, exclusive of cost of drugs.

b Calculated from the number of hospital-patient days according to diagnosis in 1969 (Reference 16), based on the 1970 average cost of hospital-patient days.

c Calculated from the number of hospital-patient days according to diagnosis for 1969 and based on the 1970 average cost of a hospital-patient day (Reference 17).

d Extrapolated from data on the distribution of hospitalization cost of corresponding disease categories.

e Based on national figures (Reference 16), and using the ratio of the cost of medical care to the cost of hospitalization in Quebec (Reference 15).

TABLE 56, cont'd.

Cost Item	Level of Cost \$	Potential Savings from Improved Nutrition	
		% of Cost ¹	\$
Dental Care ^f	338,000,000	50	169,000,000
Loss of Productivity (Premature Death)			
Anaemias and other nutritional deficiencies ^g	-	-	-
Cirrhosis of the liver ⁿ	162,214,000	33	54,071,000
Obesity ^g	-	-	-
Diabetes ⁱ	19,138,000	50	9,569,000
Heart and vascular diseases ^h	1,230,153,000	20	246,031,000
Digestive system diseases ^g	-	-	-
Respiratory system diseases ^h	670,700,000	20	134,140,000
Uro-genital diseases ^g	-	-	-
Infant deaths and still births ^j	2,671,777,000	50	1,335,888,000
	4,753,982,000		1,779,699,000
Loss of Productivity (Absenteeism) ^k			
School	213,600,000	15	32,040,000
Work	1,422,409,000	15	213,361,000
	1,636,009,000		245,401,000
TOTAL COST FOR CANADA	7,796,128,000		2,462,989,000

f Based on statistics from a study of dental care in Canada sponsored by Health and Welfare Canada (Reference 18).

g No data available on loss of life due to these causes, thus are not considered to be specific causes of deaths (by themselves) in all age groups combined.

h Calculated on the basis of the potential years of life lost (Reference 16), and the average annual salary (Reference 19).

i Calculated from the number of deaths in the Leading Causes of Death, 1971 (Reference 17), and the average age of group to determine years of lost productivity to age 65.

j Calculated from numbers of pre- and post-natal births in Canada in 1971 (Reference 17). Cost is figured on the basis of loss of years of productivity to age 65, times the average wage in 1974 (Reference 19), minus the cost of education based on 1970 cost of elementary and secondary education (Reference 17).

k Based on an average rate of absenteeism of 6 days per year per person due to sickness from nutrition-related diseases (including infections, anaemias, diabetes, food allergies, digestive diseases, etc.) and inability to learn or perform effectively. Statistics on cost of education and labour force as in Reference 17.

l Based on estimates of potential savings resulting from improved nutrition (Reference 20).

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Trenholme, M. and H. Milne, "Study of Teenage Eating in Ontario," Canadian Journal of Public Health, 54, 1963, 455-462.

The purpose of this study is to evaluate the food use of grade nine students in Ontario, using Canada's Food Guide as a criterion and to use this appraisal as a tool in educational programs.

Waddell, D.E., "A Nutritional Survey of a Small Fishing Village in Nova Scotia," Canadian Journal of Public Health, 59, 1968, 475-478. This is a report of a survey of an entire fishing village population to determine its general nutrition and levels of serum cholesterol with particular relation to the consumption of fish and associated fatty acids and any effect this might have on the state of health of the population.

Webb, J.F. and F.B. Swan, "Nutritional Aspects of a School Health Study in Marysville, New Brunswick," Canadian Journal of Public Health, 37, 1946, 399-406.

The purpose of this study is to determine health problems, especially those relating to nutrition of the Marysville school children and to obtain information on the nutritional status and food habits of a group of New Brunswick children for the information of Nutrition Services.

Webster, F.M. and M.S. McCready, "A Dietary Survey in Farm Households at Ile Perrot, Quebec," Canadian Journal of Public Health, 36, 1945, 152-156.

This study investigates the nutrient content of the families' diets and its relationship to food expenditure, family size and home production.

Young, E.G., "An Appraisal of Canadian Nutriture," Canadian Bulletin on Nutrition, 3(1), July 1953.

By reviewing the available data which contribute to the picture of the present state of nutrition of the Canadian people, Young appraises the current knowledge and suggests further facts necessary to provide an adequate picture. The majority of information used is pre-1950.

Canadian Graduate Theses

Campbell, A.V., Study of Some Aspects of the Nutrition and Physical Development of Pre-School Children, Thesis, University of Guelph, 1970.

Escott, J., An investigation of the Introduction of Solid Food to Infant Diets, Thesis, University of Guelph, 1976.

Kerr, M., A Dietary Study of Deaf Adolescents, Thesis, University of Guelph, 1975.

Miller, L., A Nutrition Survey of Girls in Residence at the University of Manitoba, Thesis, University of Manitoba, 1957.

Reid, D., Dietary Study of Non-Institutionalized Elderly Citizens, Thesis, University of Guelph, 1972.

Wheeler, N.G., Mother's Knowledge and Practice of Nutrition in Relation to Nutrient Intakes of PreSchool Children, Thesis, University of Guelph, 1971.

3. Food Expenditure and Consumption

Anderson, O.H., "Three-Day Food Habits' Study of 135 Expectant Mothers," Canadian Nutrition Notes, 23(7), August/September 1967, 73-75.

A survey was made of 3-day food habits (excluding Saturday and Sunday) of 135 expectant mothers who registered for prenatal classes in St. John's, Nfld. during the period September 1963 to March 1965. Each participant recorded her food intake (what and how much was eaten) for three days. The purpose of these records was: (a) to determine to what extent Canada's Food Guide was being followed prior to instruction in prenatal classes, and (b) to show the participants where changes in their eating habits would be desirable.

Aucoin, D., M. Haley, J. Rae and M. Cole, "A Comparative Study of Food Habits: Influence of Age, Sex and Selected Family Characteristics," Canadian Journal of Public Health, 63(2), 1972, 143-151.

A project has been designed to obtain information to assist the Nutrition Division of the Nova Scotia Department of Public Health in planning nutrition education programs at the provincial level. In 1970, a study was conducted to evaluate the existing food habits of Nova Scotia students, and to study the influence of age, sex and selected family characteristics upon those food habits.

Aykroyd, W.R., "The Consumption of Sugar," British Nutrition Foundation Bulletin, 8, 1973, 21-29.

The article presents a brief description of the history of sugar, its production and consumption. The emphasis of the article is on world-wide modern trends in the production and consumption of sugar.

Burk, M.C., Trends and Patterns in U.S. Food Consumption, Agriculture Handbook No. 214, U.S. Department of Agriculture, Economic Research Service, Washington, D.C., 1961.

This publication discusses the broad outlines of trends in U.S. food supplies and consumption during the period 1909-1959. Also, some of the more significant patterns of cross-sectional variations within the country in selected time periods during the 50-year period studied, are presented.

Dawson, R.M., "Beverage Survey in Ten St. John's Schools, Newfoundland, March 1967," Canadian Nutrition Notes, 25(2), February 1969, 13-18.

The article reviews the results of a study of beverage consumption of students in grades 3, 6, and 10. The questionnaire is included.

Doyle, M.T., M.C. Cahoon and E.W. McHenry, "The Consumption of Recommended Foods by Children in Relation to Sex, the Use of Sweet Foods, and Employment of Mothers," Canadian Journal of Public Health, 44(7), 1953, 259-262.

This study investigates the food consumption patterns of students in grades 6, 7 and 8 in Toronto in 1953 using a 7-day diary. Also investigated is the effect of use of sweet foods on the consumption of other foods; differences in consumption for boys and girls; and the influence of regular out-of-home employment of mothers on the nutritional quality of meals obtained by children.

Drayton, L.E., "Consumption of Powdered Skim Milk in Canada," Economic Annalist, 35(3-4), June-August 1965, 46-56.

This article attempts to demonstrate the extent of the substitution of powdered skim milk for fresh milk, especially for household uses.

Economic Research Service, Food Consumption, Prices, Expenditures Supplement for 1973, U.S. Department of Agriculture, Washington, December, 1974.

Statistics are provided on food consumption, prices, expenditures and nutrients available for consumption, for the period 1960-1973.

Economic Research Service, National Food Situation, U.S. Department of Agriculture, Washington, November, 1976.

This quarterly document provides data and articles on all facets of food production, consumption and the food industry in the United States.

Farquharson, C.D., J. Deeks, M.J. Veen and R. Barnes, "Food Intakes of Teachers and of Industrial Employees," Canadian Journal of Public Health, 50(2), 1959, 80-82.

A food consumption survey (using a 7-day diary) has been conducted on industrial (skilled) employees and elementary school teachers in the Township of Scarborough. Food intakes have been evaluated in terms of Canada's Food Rules. The observations of the adults are also compared with those of the children in a study conducted by the Toronto Nutrition Committee.

Food Prices Review Board, Final Report--"Telling It Like It Is," Ottawa, February 1976.

The main objective of the Report is to describe the role and activities of the Board. In addition, the Report reviews the food price trends which led to the establishment of the Board. It also forecasts the likely course of price developments and identifies desirable policy responses in the food sector into the 1980's.

Food Prices Review Board, What Price Nutrition?, Ottawa, February 1975.

This study is directed to the questions of what constitutes a nutritious diet, what it costs and whether Canadians can afford it, particularly in regard to the circumstances of typical families living in the major urban centres of Canada.

Hassan, Z.A. and S.R. Johnson, Urban Food Consumption Patterns in Canada, Agriculture Canada, Ottawa, January, 1977.

"Demand parameters for 122 food items were estimated, using data from the 1974 Urban Family Food Expenditure Survey. These parameters provide a basis for computing expenditure, income, quality, family size and price elasticities. The price elasticities were computed by using implicit prices derived from the expenditure and quantity data. The effects of partitioning the sample by income, class, city and first and second halves of the year were also investigated."

Hassan, Z.A. and D.T. Karamchandani, Handbook of Food Expenditures, Prices and Consumption, Department of Agriculture, Economics Branch, Ottawa, June, 1976.

This annual publication provides current and historical data, sourced mainly from Statistics Canada. The major categories of information provided are: population, income and food expenditures, family expenditures, retail food price indexes, pounds of food consumed annually, and supply and disappearance quantities. Also, selected information is provided for the United States and the O.E.C.D. and developing countries.

Hollingsworth, D.F. and J.P. Greaves, "Consumption of Carbohydrates in the United Kingdom," American Journal of Clinical Nutrition, 20(2), 1967, 65-72.

Estimates of trends in consumption of carbohydrate-containing foods between 1880 and 1964 are presented. Longer term trends in consumption of wheat, sugar and potatoes are described. The distribution of U.K. sugar supplies in 1938, 1949 and 1965 is given, along with a brief discussion on the potential use of artificial sweeteners. Using National Food Survey results and a pre-W.W.II survey of households of different social classes, changes in the consumption of carbohydrate foods by households are examined.

Johnston, C.I., Seasonal Changes in Quantities of Foods Purchased, Department of Agriculture, Economics Branch, Ottawa, July, 1960.

This study is based on data collected by the Dominion Bureau of Statistics in the 1953 and 1955 food expenditure surveys. In each month, a different sample of families in Halifax, Montreal, Toronto, Winnipeg and Vancouver reported their purchases over a 2-week period. The purpose of this study is to investigate the seasonal pattern of quantity purchased of each of 30 food items. The items are in general those representative of the major food groups on which expenditures per person were highest.

Johnston, C.I., Urban Family Expenditure for Certain Milk Products: 1957, Department of Agriculture, Economics Branch, Ottawa, November, 1963.

Data for this study were derived from the unpublished data of the 1957 food expenditure survey conducted by the Dominion Bureau of Statistics. The survey was conducted in Halifax, Montreal, Toronto, Winnipeg and Vancouver. Data concerning various kinds of fluid milk and cream, and canned and powdered milk are analyzed mainly to show the relation between

rates of purchase and family characteristics. Interrelations between purchase rates of the 4 products are also examined.

Karamchandani, D.T., "Changes in Food Expenditure Patterns, 1969-1974," Canadian Farm Economics, 11(5), October 1976, 16-29.

"The purpose of this article is to examine, using food survey data, food expenditure patterns of urban families in Canada to determine what changes have occurred between 1969 and 1974. To achieve this purpose a study is done of changes in weekly food expenditure, changes in expenditure shares by commodity group, per capita expenditures by income level, and changes in food prices, consumption and expenditures for individual commodities."

Karamchandani, D.T., "Trends in Food Consumption, Prices and Expenditures, 1961-1973," Canadian Farm Economics, 11(1), February 1976, 17-26.

"The objective of this article is to examine changes that have occurred in food consumption, prices and expenditures from 1961 to 1973, and to show the extent to which prices and consumption are related. Expenditures for food and non-foods are examined in relation to changes in disposable personal income. The article also takes into account population growth and its impact on total food consumption."

McClinton, P., H. Milne and G. Beaton, "An Evaluation of Food Habits and Nutrient Intakes in Canada: Design of Effective Food Guides," Canadian Journal of Public Health, 62(2), March/April 1971, 139-146.

"To design an effective food guide, an investigation was made to develop a pattern of food usage which would (a) supply nutrients in recommended amounts and, (b) reflect closely actual food group intakes. The analysis was made on nutrient and food group intakes obtained from studies previously undertaken for different areas of Canada."
(Journal abstract.)

McCormick, V., "Consumption of Milk, Dairy Products and Margarine," Canadian Farm Economics, 6(6), February 1972, 22-26.

The 1969 study of food expenditures by Statistics Canada is the source of data for this article. From the consumption data available from the survey, the author concentrates on reporting the findings on Canadian consumption of milk, certain dairy products and margarine. The data are discussed by region of Canada, and by several urban/rural categories.

Monagle, J.E., "Food Habits of Senior Citizens," Canadian Journal of Public Health, 58(5), May 1967, 204-206.

The article emphasizes the lack of knowledge in the field of geriatric nutrition. At the time of publication of this article there had been in Canada only 2 studies documented dealing with the eating practices of senior citizens: one conducted by National Health and Welfare between 1956 and 1963, and one by the University of Manitoba in 1963. Both of these studies are reviewed.

National Food Survey Committee, Household Food Consumption and Expenditure: 1965. For the Ministry of Agriculture, Fisheries and Food, London, 1967.

This is the annual report of the survey of households of Great Britain on food consumption, expenditure and nutritional status. This report places special emphasis on the results of the surveys covering the decade 1956 to 1965.

Nutrition Canada, Food Consumption Patterns, Health and Welfare Canada, Ottawa, 1977.

The major aims of this study are to examine the average consumption of selected food groups and their contribution to nutrient intake of Canadians, to examine patterns of food consumption and nutrient intake at various times of the day, and to provide information on the changes in eating habits during pregnancy. As well as examining these topics by age groups, the Eskimo and Indian samples are investigated.

Pando, J.L., "The Trend Pattern of Butter Consumption in Canada," Canadian Farm Economics, 5(5), December 1970, 28-37.

The purpose of the article is to explain how the economic conditions during the 1950-1969 period influenced the declining trend in the per capita consumption of butter during that period. Results of this analysis are used to project per capita consumption for 1975 and 1980.

Shute, D.M. and Z.Y. Yankowsky, "Trends in Per Capita Food Consumption in Canada (1949-1971)," Canadian Farm Economics, 8(2), April 1973, 25-31.

"The objectives of this paper are to examine the patterns of per capita food consumption in Canada for the period 1949 to 1971 and to analyze the trends over this period for each of the major food components." (Journal abstract.) The food groups studied were: cereals, sugars and syrups, pulses and nuts, fruit, vegetables, potatoes, oils and fats, meat, poultry, fish, dairy products, eggs, and beverages.

Spencer, B.G., A Preliminary Paper on Family Food Expenditure in Canada--An Analysis of the 1974 Survey, Food Prices Review Board. Based largely on the Statistics Canada 1974 Family Food Expenditure Survey, this report investigates the determinants of demand for 24 food items, representative of the major classes of food expenditures. For each item, an attempt is made to measure the responsiveness of demand to the price of the item, the price of a substitute good, the level of family income, and other variables measuring demographic, social, cultural, geographic and seasonal influences on food demand.

Spencer, B.G. and C.H. Feaver, The Consumption of Bread and Fluid Milk in Canada, Food Prices Review Board, Ottawa, July, 1975.

This study measures, through the use of statistical analysis, the responsiveness of bread and milk consumption to changes in the prices of these foods, of substitutes for these foods, and to changes in average income levels. Price and income elasticities are calculated and are discussed in relation to nutritional consequences of bread and milk consumption.

Spencer, M. and R. Vawter, "Regina City and Regina Rural Health Regions Teenage Food Habit Surveys," Canadian Nutrition Notes, 24(5), May 1968, 49-57.

This article reviews the results of 2 surveys conducted among city and rural high school students to ascertain their eating habits and attitudes towards foods. Data were also obtained on height and weight and the students' ideas as to whether or not they were overweight. The questionnaires used are included in the article.

Statistics Canada, Apparent Per Capita Domestic Disappearance of Food in Canada, Cat. No. 32-226, Ottawa.

This annual publication provides data on the per capita disappearance of food in Canada for both retail weight and fresh equivalent for the major food groups, in detail. In recent years, the supply and disposition data are also provided.

Statistics Canada, Family Food Expenditure in Canada, 1969, Vol. 1, Cat. No. 62-531, Ottawa.

The results of the 1969 family food expenditure survey are presented in this publication. Detailed average food expenditures and quantities for families and unattached individuals living in Canada, within urbanization size groups, and regions.

Statistics Canada, Urban Family Food Expenditure 1974: Selected Tables, Revised January 1976, Ottawa.

The tabulations of family food expenditure were obtained from a survey conducted throughout 1974 in 14 major Canadian cities. The tables were assembled as a temporary measure to extend the information available from the 1974 urban family food expenditure survey prior to its publication.

Ware, D.W., "Changing Patterns in Consumption with Particular Reference to Dairy Products," Canadian Farm Economics, 1(2), June 1966, 14-17.

The article discusses apparent per capita consumption in Canada, comparing the period 1962-64 with the period 1955-57. Apparent consumption of the major food groups is discussed with emphasis on dairy products. Reasons for changing consumption patterns as well as future trends are posited.

Canadian Graduate Theses

Barrett, L. The subject of this thesis is the total caloric consumption of Manitoba populations. Thesis, University of Manitoba, circa 1975.

Cornellier, J. Etude des habitudes alimentaires de familles canadiennes-françaises de la ville de Montréal, Thesis, University of Montréal, 1966.

Dickie, J. The topic of this thesis is infant diets, Thesis, University of Montreal, in progress.

Dubois, S. The topic of this thesis is the feeding practices of 4-6 month old infants, obese and normal weight, Thesis, University of Toronto, in progress.

Gagnon, G. The topic of this thesis is infant diets, Thesis, University of Montréal, in progress.

Lau, D. The topic of this thesis is the food consumption patterns and the occurrence of zinc and copper in the diet of immigrants from the Caribbean Islands, Thesis, University of Toronto, circa 1974.

Lynde, B. The topic of this thesis is the eating patterns and behavior of 100 Italian immigrant families in Toronto, Thesis, University of Toronto, in progress.

McClinton, E.P. An Evaluation of Food Habits and Nutrient Intakes in Canada: Design of Effective Food Guide, Thesis, University of Toronto, 1967.

Ratz, J.E. An Analysis of 700 Weekly Food Records of Low-income Families and the Practical Application of the Information Thus Obtained, Thesis, University of Toronto, 1951.

Reaburn, J. The topic of this thesis is food consumption patterns of low-middle class homemakers in the Hamilton area, Thesis, University of Toronto, 1977.

Savage, W. This thesis studies food patterns of immigrants to Canada from tropical countries who are infested with parasites, Thesis, University of Toronto, circa 1971.

Sidorchuk, L. The Effect of a Basic Foods Program on the Purchasing and Preparation Habits of Women Receiving Public Assistance, Thesis, University of Manitoba, 1971.

Sister Seigny. The topic of the thesis is food consumption in different social groups in the Quebec City area, Thesis, University of Laval, in progress.

Strang, J. Obesity: A Study of Caloric Intake Energy Expenditure and Success in Weight Reduction of a Group of Obese Women, Thesis, University of Manitoba, 1964.

Tidbury, P. The topic of this thesis is the food patterns of women residents and participants of the central Y.W.C.A. of Montreal, Thesis, University of Montreal, in progress.

A Ph.D. candidate at the University of Toronto will begin April, 1977 on a study of food consumption patterns and food attitudes of the elderly in Toronto.

4. Economics

Emmery, M.K., The Outlook for Poultry Meat in Canada to 1980, Department of Agriculture, Economics Branch, Ottawa, December, 1967.

This study examines the major factors behind the observed trends in the supply of and demand for poultry meat, and projects future changes in the causal factors and their influence on poultry meat consumption and prices. Supply and demand are projected for the period 1967 to 1980 on the basis of expected changes in the major causal factors.

Gifford, M.N., "A Net Importer in 1969: Canada's Agricultural Trade in Perspective," Canadian Farm Economics, 5(4), October 1970, 1-10. This article attempts to explain the change in Canada's position from an agricultural exporter in the 1950's and earlier 1960's to an importer in the late 1960's.

Hiscocks, G.A., "Agricultural Policy," Canadian Farm Economics, 6(1) April 1971, 1-11.

This is a review of the current Canadian agricultural policy and programs including its objectives and direction for the future.

Yankowsky, Z.Y., "Agricultural Demand Supply Projections for 1980," Canadian Farm Economics, 6(3), February 1969, 11-17.

This article discusses the results of a projection exercise, that is, an attempt to quantify the food supply and demand situation in Canada in 1980. The purpose is to study the situation towards which current trends appear to be moving. The author emphasizes that the results are not forecasts of food supply and demand.

Canadian Graduate Theses

McIntosh, C., The Demand for Meat and Dairy Products in Canada with Projections to 1980, Thesis, University of Alberta, 1972.

Sackey, N., An Analysis of the Demand for Cocoa in Canada and in the U.S. 1950-1972, Thesis, University of Alberta, 1976.

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